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Transition structure on one of the 146 siphons being built on the Colorado River Aqueduct

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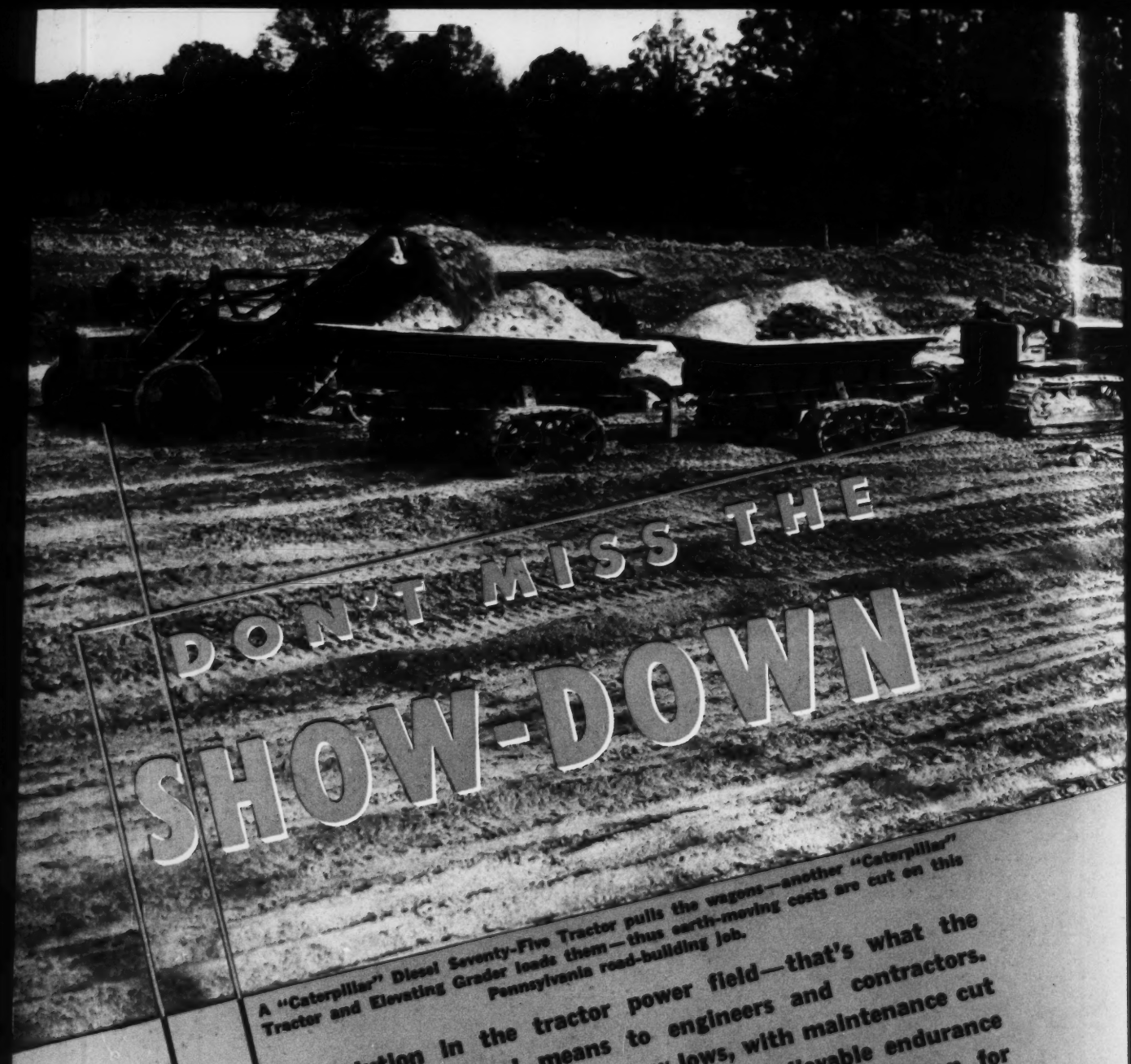

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Not Settled *Until It Is Settled Right*

DURING recent weeks the construction industry has been disturbed by the attitude of the Works Progress Administration toward the allocation of the $4-billion work-relief appropriation. Its regulations, thus far announced, have revealed as little respect for the welfare of the industry and its workers as they have for the taxpayers' interests and for the conditions prescribed by the President when he asked Congress for the $4-billion. Last week this page commented on this subject with special reference to the highway program; much the same considerations apply to other types of public construction.

The inherent fallacy of the announced program is that the whole $4-billion must be applied to one year's direct employment on field operations for the 3½ million unemployed who happen to be on relief. By a very explicit ruling, the effect of public works construction in making or destroying secondary employment must be ignored. And this is despite the President's insistence that the essential objective of the program is to foster employment in private business which, in the case of public construction, means secondary employment with those contractors and producers who would carry on the work and provide the necessary materials and equipment.

UNFORTUNATELY, regardless of regulations and of what they may ignore, the effect is there: because of it, the net result of the new program would be to take jobs away from workers who, on the basis of merit and competence, find normal employment in such industries, in order to create jobs, on a subsistence basis, for those who may happen to be on relief. Many good workmen thus deprived of their jobs may be self-sustaining for a time; but because they do not show up at once on relief rolls we should not delude ourselves that we have reduced actual unemployment. Sooner or later many of these will go on relief and thereby replace those who may at this time benefit by the new program.

In other words, the new program is a very effective device to conceal and perpetuate unemployment by the simple device of shifting it for the time being to those who can carry on for a little while longer.

Most shocking is the summary fashion in which the new program repudiates the specifications upon which the President won the favorable action of Congress on the $4-billion appropriation. On the strength of those specifications many contractors and manufacturers, during the last six months, have pulled up their belts another hitch, held their key men a little longer, dug a little deeper into their remaining resources and otherwise assumed obligations that have meant an actual or potential increase in normal employment. Today these men stand aghast at a turn which has so completely reversed the President's program and abandoned his announced objectives.

No less disturbed are the department and bureau heads of both federal and local governments, who during the last two years have labored so effectively to develop sound and worth while construction programs that would stimulate normal employment and provide useful public works. Both these requirements, be it noted, were specifically laid down by the President in January; both now are summarily renounced by the new program. Experienced engineers and constructors know that a limitation of $1100 to $1400 per man-year of field employment must rule out almost every public works project that can meet the President's specifications. So the Works Administration would scrap all their plans along with the President's specifications: for them they would substitute the same type of public spending that marked the CWA, which, however excusable an emergency expedient, stands hopelessly discredited as a constructive or continuing solution to the unemployment problem.

Despite all this, the construction industries cannot afford to take counsel of their disappointment and chagrin. We must remember that in dealing with such a problem no such inadequate solution can prevail. Once they awake to its significance, the people of this country will not countenance a program that contemplates and fosters a continuing public subsidy to 3½ million at an annual cost of $4-billion, with the certainty that they will have little substantial return for the expenditure. They will not subscribe to the proposition that in order to make places on the public payroll for those who may happen to be on relief, we should boycott producers and penalize their employees, both of whom must find their business and hold their jobs on a basis of individual merit.

SOONER or later we shall return to the rational program originally outlined by the President. The process may be piecemeal and unostentatious but it will be none the less substantial and inevitable. Meanwhile the contractors and producers of the construction industry can count upon a continuation of the large federal projects that now are under way and on certain non-federal works under the liberalized regulations of the PWA. Then, too, the volume of construction through private capital is consistently increasing with many influences making for continued growth.

So, while we deplore this unfortunate perversion of the public works program and while we bend every effort speedily to reestablish more rational procedure, each of us owes it to his fellows to carry on with the job next to hand, confident in the ultimate triumph of the influences that now are making for recovery and doing his best to hold his place in the march back to better times.

Willard Chevalier

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IN DEEP MUD, SAND, GUMBO

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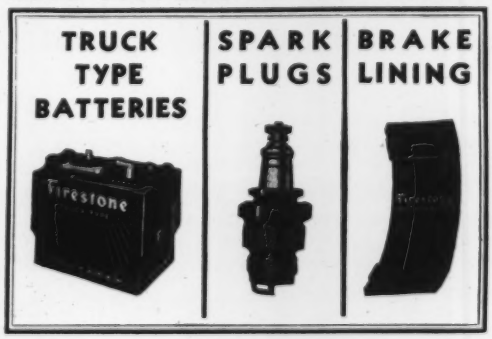
AUTO SUPPLIES AT BIG SAVINGS



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ENGINEERING NEWS-RECORD

June 27, 1935

FIG. 1—TRANSITION STRUCTURE at junction of cut-and-cover conduit with twin circular siphons on Colorado River Aqueduct.

Principles of Siphon Design for Colorado River Aqueduct

Fundamental structural and economic principles and practical considerations governing design of 146 inverted siphons on 242-mile aqueduct for additional water supply for metropolitan Los Angeles

By D. B. Gumensky
Assistant Engineer, Metropolitan Water District, Los Angeles, Calif.

A TOTAL of 146 inverted siphons has to be constructed in the 242.3 miles of the Colorado River aqueduct for the additional water supply of the metropolitan area of Southern California. These siphons traverse a terrain varying topographically from steep mountain gorges to broad valleys and encounter ground conditions varying from the most stable mountain granite to desert sands subject to erosion by water and wind. At places the locations were across earthquake faults. Obviously such varying conditions made design a complex problem, and all of the details of solution may not be presented with reasonable brevity. This article, then, is limited to a statement of the controlling design and economic principles that were observed.

It is important first to understand the magnitude of the task. The main Colorado River aqueduct stretches 242.3 miles from Parker Dam on the Colorado River to its terminus at Cajalco Reservoir about 50 miles east of Los Angeles (Fig. 3). The inverted siphons in the aqueduct aggregate 28.9 miles, or 11.9 per cent of its total length. Those designed for immediate construction will involve the following quantities: excavation, 3,058,000 cu.yd.; concrete, 348,000 cu.yd.; reinforcing steel, 31,000 tons; and cement, 471,000 bbl. The cost of this construction will amount to $10,799,000. In addition, about $8,709,000 of construction is deferred until such time as the water demand will warrant it, bringing the total cost of siphons to $19,508,000.

The problems concerning these siphons were: selection of the proper location; selection of the type and size of the structures which, in turn, embraced the probable future development of the water demand, and the hydraulic, economic and structural design of the siphons. The location of the siphons, somewhat subordinate to the general problem of the aqueduct location, played its part in the selection of the final route.

Determining size and slope

The first problem of siphon design was to determine size and hydraulic slope in relation to ultimate economy. The Colorado River aqueduct is essentially a pumping project. The water is taken out of the river at an elevation of 450 ft. above sea level and is delivered to Cajalco Reservoir at an elevation of 1,405 ft., requiring a net lift of 955 ft. An addi-

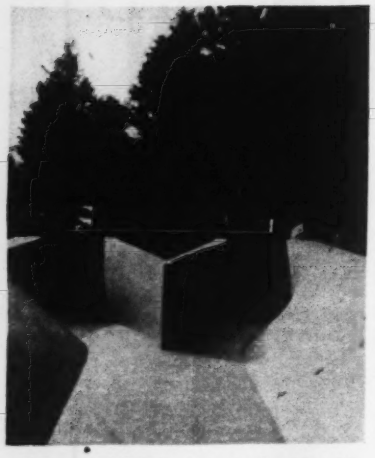


FIG. 2—MODELS were used and trial structures were built in working out the design of siphons for the Colorado River aqueduct; this is a model of a transition from open canal to a two-barrel circular siphon.

SIPHONS IN COLORADO RIVER AQUEDUCT FROM PARKER DAM TO CAJALCO RESERVOIR

Section	No. of Siphons	Typical Size, Ft. In.	No. Bbl. and Type	Length in Ft. Max.	Length in Ft. Min.	Total	Max Head in Ft.
A	10	12 4	2-cir	2,300	175	8,675	
	4	16 0	1-cir	435	175	1,232	
B	73	9 9	3-sq	560	260	26,300	
	2	12 4	2-cir	15,540	650	16,190	
	14	12 9	2-cir	3,440	340	16,575	
C	2	12 4	2-cir	1,438	300	1,738	
D	7	9 9	3-sq	610	410	3,070	
E	1	12 0	2-cir	781	...	781	
	25	12 4	2-cir	26,417	300	73,717	
	7	16 0	1-cir	400	200	1,960	
	1	11 5	2-cir	2,235	...	2,235	
Total Length				152,473 = 28.9 miles			

tional lift is required to give the aqueduct sufficient slope to produce flow, resulting in a total lift of 1,618 ft., made at five different pumping plants. The capitalized yearly cost of this pumping is a vital factor in arriving at the most economical location and in the selection of the proper size and type of conduit.

The carrying capacity of a water conduit is a combined function of its cross-sectional area, the shape of its water prism, the character of the inner surface and the hydraulic slope causing the water to flow through the conduit. For any given type of construction the shape and the inner surface of the conduit are constant. Therefore, the two variable factors governing the discharge of water through a given type of conduit are: the size, determining the cross-sectional area of the water prism, and the hydraulic slope producing the velocity of the flow.

For a constant flow of water, if the slope is flat, the velocity of the water is slow, and the size should be relatively large to give the required discharge. The flat slopes requiring large-size conduits result in high initial construction cost, but the loss of head in a given length is small, and consequently the cost of pumping is low. By increasing the slope the water would be made to flow faster, and therefore a pipe of smaller size would deliver the same quantity. This would effect a saving in initial construction cost, but the drop in elevation necessary to produce the flow would be greater and the cost of pumping would be increased.

Selection of the most economical size and slope for siphons should be made in such a manner that the combined cost of construction, operation and maintenance is a minimum.

Fig. 4 illustrates the fundamental relationship of the quantities involved and the solution of the problem for one of the individual double-barrel siphons under an average head of 30 ft. On the left side of the diagram, costs of the siphon in dollars per linear-foot are plotted against the slope and the diameter of the siphon (for a constant flow one determines the other). The minimum total cost of the siphon that we are seeking falls on a slope of .00065, corresponding to a diameter of 12 ft. 9 in.

From differential calculus the value of a function is a minimum when its first derivative with respect to an independent variable is equal to zero. Designate total cost of siphons Ct; capitalized present cost of construction Cc; capitalized present cost of operation and maintenance Com; and slope S. Then for minimum cost: $\frac{dC_t}{dS} = 0$, but $C_t = C_c + Com$.

Therefore $\frac{d\,Cc}{ds} + \frac{d\,Com}{ds} = 0$, or

$$\frac{d\,Cc}{ds} = \frac{-d\,Com}{ds}$$

The last equation means that the minimum total cost of siphon will correspond to a point where the rate of change in construction cost (represented by a tangent to the curve Cc at point E) and in cost of operation and maintenance with respect to the slope are equal in value (angled) and opposite in sign. The above principle underlies the use of cost-slope curves in determination of the economic size and slope of water conduits. The right side of the diagram shows the application of this principle. Curve Cc represents the capitalized present cost of construction, including cost of the deferred construction of a second barrel. Line AB represents the rate of change in capitalized cost of installation, opera-

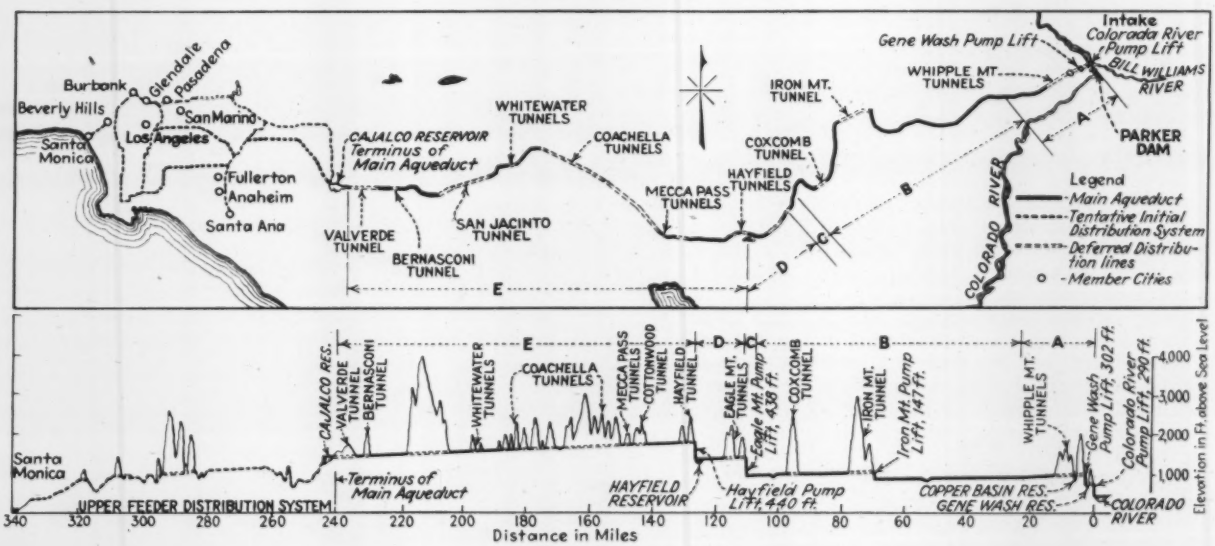


FIG. 3—PLAN AND PROFILE of Colorado River aqueduct, showing changing terrain to which siphon design had to be adapted.

tion and maintenance for the set-up under consideration. By sliding the line *AB* parallel to itself until it becomes tangent to the curve *Cc* at point *E* we find the most economical size of the siphon. It should be noted that the variation of total cost near its minimum value is slight. Generally it is desirable to steepen the slope more than theoretically required, as it will effect a saving in construction cost and will tend to discount the predictions of future water demand.

The above procedure is applicable only to long lines where the effect of transition losses is slight. In short siphons the effect of transition and bend losses had to be considered, and the total-cost, total-head-loss curves were used in essentially the same manner as cost-slope curves.

In arriving at the sizes to be used in the aqueduct, the most economical size and slope for each individual siphon had been determined. To avoid the impracticable multiplicity of sizes, the siphons were grouped geographically, and further studies were made on the economy of various combinations. The final selection of sizes was made with a view to low initial construction cost and low total ultimate cost, giving consideration to the division of the aqueduct length into convenient construction units.

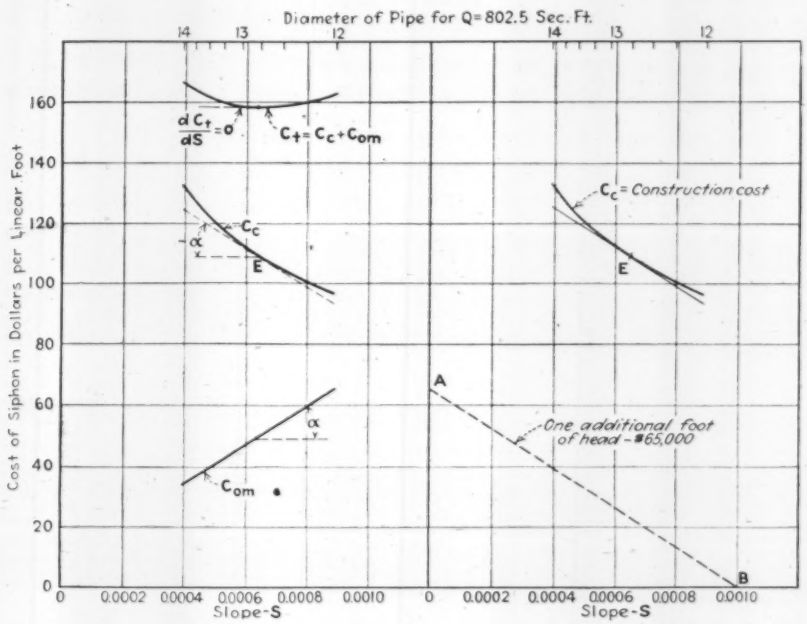


FIG. 4—TYPICAL CURVES for computing size and slope of siphon for minimum cost.

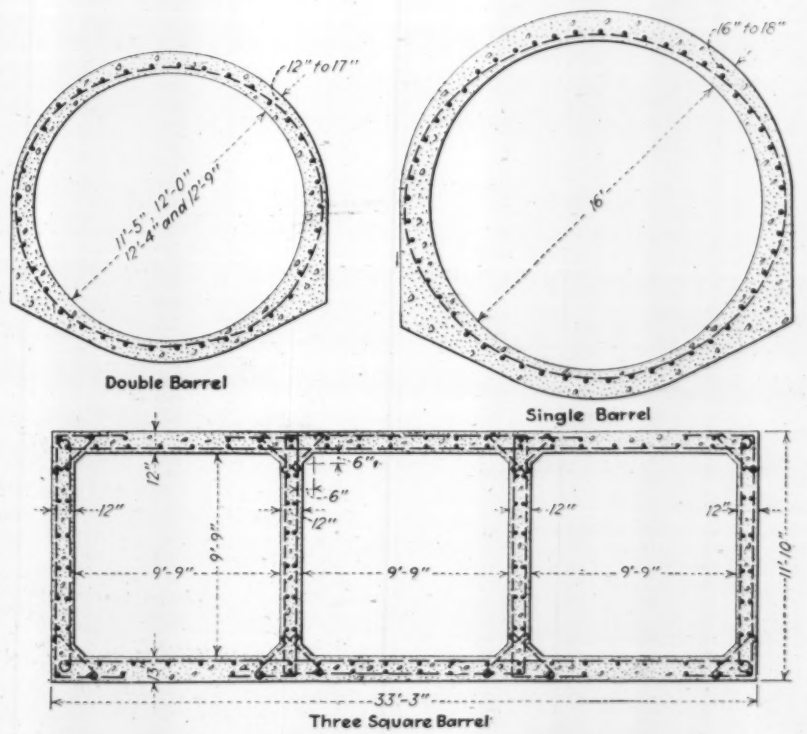


FIG. 5—TYPICAL SIPHON SECTIONS used on the Colorado River aqueduct. The double-barrel section is one-half of ultimate construction.

Type and design determination

Selection of the proper type of construction was essentially an economic problem strongly merging into the structural design. There were three general types of siphons suitable for the construction of the aqueduct: reinforced concrete monolithically poured in place; precast reinforced-concrete pipe; and steel pipe. Experience with previous installations and comparative cost estimates had shown that the monolithic-concrete construction would be the most economical. However, in case of double-barrel siphons, alternative bids were called for precast concrete pipe and, wherever construction of pipe above ground was feasible, bids were also called for welded steel pipe. These competitive bids showed the decided economic advantage of monolithic construction.

Previous to the general advertisement of work on the siphons the district had built two trial siphons, a 12-ft.-diameter precast concrete pipe across Little Morongo Canyon, and a 12¾-ft. monolithically poured concrete pipe at East Fan Hill. This was done as an aid in comparing the relative merits of precast and monolithic construction on large-diameter siphons and to perfect the plans and specifications. (*ENR*, July 12, 1934, and Oct. 25, 1934).

It was found that for siphons of considerable length and subjected to pressures higher than 20 ft. of head, the double-barrel type is more economical, with construction of the second barrel deferred until such time as water demand makes it necessary. For short siphons of low head between sections of tunnel and cut-and-cover conduit a full-capacity, single 16-ft.-diameter barrel was used. Short siphons of low head between canal sections were most economical as a three-barrel rectangular box constructed as a single unit. Transitions at the ends of these siphons had a decided influence on the design and the selection of the type to use.

Crossing Earthquake Faults—Major earthquake faults are crossed by Big Morongo, San Andreas and Casa Loma siphons. Although the monolithic type of construction is exceptionally resistant to the vibrations and the shocks that may by produced by an earthquake, the actual

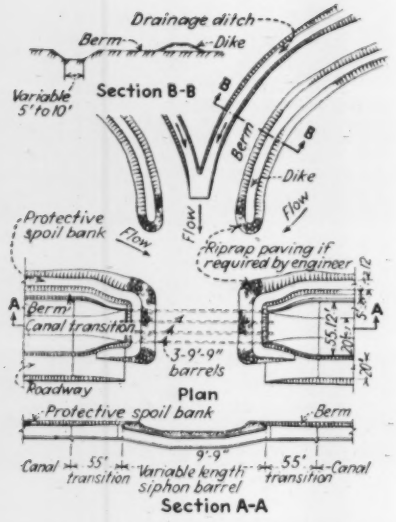


FIG. 6—CONSTRUCTION of box siphon in draw, showing training ditch and dike layout for intercepting sheet flow from cloudbursts.

displacement of ground across the siphon is likely to extend the damage for a considerable distance because of the continuity of the structure. In faulted zones the monolithic construction was broken every 20 ft. by joints capable of transmitting shear but no tension. Fig. 7 shows the two types of joints adopted. In case of earthquake disturbances and displacement of ground these joints will give the siphons the desired flexibility, and, should an actual rupture occur in the line, will confine the damage to only a few sections. For heads under 80 ft. a poured-in-place joint with a steel waterstop will be used, changing to a patented lock joint for heads of 80 ft. and over. In the call for bids alternative plans were also included for precast concrete pipe and for steel pipe supported on ring girders above the ground. As a precaution against the possible vertical displacement of the ground an additional drop of 2½ ft. over that required by siphon losses was provided in the hydraulic gradient of each of the above siphons.

Capacity—The capacity of the siphon should be equal to the capacity of the rest of the aqueduct. The ultimate capacity of the Colorado River aqueduct is 1,605 sec.ft., which provides for an average flow of 1,500 sec.-ft., allowing 7 per cent of time for shutdowns. In the case of double-barrel siphons where the construction of the second barrel is deferred until the water demand will make it necessary, the capacity of a single barrel is 802½ sec.-ft.

Hydraulic Design—Friction losses in siphons were computed on the basis of the Manning formula. The values selected for the coefficient of roughness n for various types of construction were: for welded steel pipe $n = .014$, for monolithic concrete construction $n = .013$, and for precast concrete pipe $n = .012$. Although both the precast and the monolithic pipe are poured against the same type of steel forms with the use of vibrators, the higher value of n was used for monolithic type because of the practical difficulty of obtaining a good surface along the invert, due to the formation of air and water pockets. Precast pipe poured standing on end is devoid of this fault. Losses at the inlet and outlet were taken, respectively, as 0.1 and 0.2 of the change in velocity head. Losses caused by bends were computed thus:

$$h = 0.25 \frac{V^2}{2g} \sqrt{\frac{\Delta}{90}}$$

in which h is the head lost in a given bend; Δ is the angle of bend, and V, the velocity in the pipe. The size and the hydraulic slope of pipes were determined from economic considerations of combined construction and operating costs, as previously explained.

Structural Design—Structural design of various types of siphon essentially involved consideration of strength, watertightness and permanence, with a view at the same time to economy because any extravagance, however small in a unit length, becomes a considerable sum when multiplied by the great total footage of this type of construction.

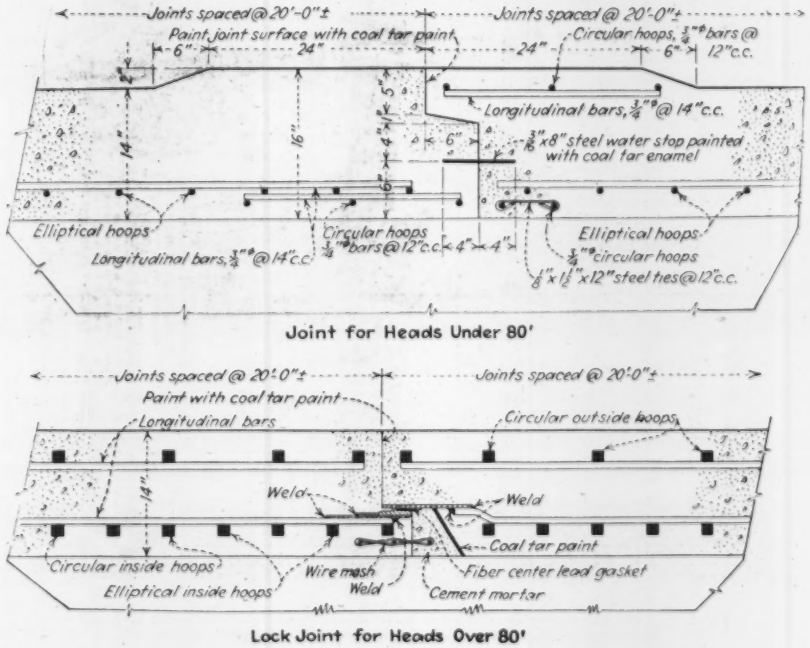
Structures as planned

All siphons in the main aqueduct, with the exception of the experimental siphon at Little Morongo Canyon, are of monolithic reinforced concrete, modified where the line crosses earthquake zones and faults. Hydrostatic pressures on these siphons are moderate, ranging from 7 to 153 ft. of head; lengths vary from 175 to 26,417 ft.

Considering the functions which siphons have to perform, they may be divided into two classes. The first class is where it is necessary to cross a canyon, a wash or some other depression. The general characteristic of this type is that the natural ground line falls considerably below the hydraulic gradient, thus subjecting the structure to hydrostatic pressure. The shape of these siphons is circular, and the reinforcement is principally governed by the internal pressure. The second class is rather peculiar to the Colorado River aqueduct and is characterized by extremely low heads. Siphons of this class provide an artificial waterway for cross-drainage in flat country traversed by canal where the storm runoff is of the so-called sheet-drainage type. The rainfall, which in western deserts often comes in the form of a cloudburst, does not run off in the form of concentrated streams and creeks but flows down the slope in a sheet with a great amount of sand. The open canal running transversely to this flow of sand and water would quickly get filled up with sand unless adequate protection were provided. This protection will be supplied by drainage ditches running diagonally to the canal, which intercept the sheet runoff flow and convey it to the places of concentration at and over the low-head siphons. These siphons are spaced at intervals determined by the character and the size of the area contributing to the runoff. Fig. 5 shows typical sections of the siphons, and Fig. 6 gives a typical layout of a three-square barrel siphon and the probable treatment of the cross-drainage problem.

The location of the aqueduct and the grouping of the siphons are shown on

FIG. 7—JOINTS USED in monolithic concrete siphons where they cross earthquake faults include provisions for localizing possible rupture.



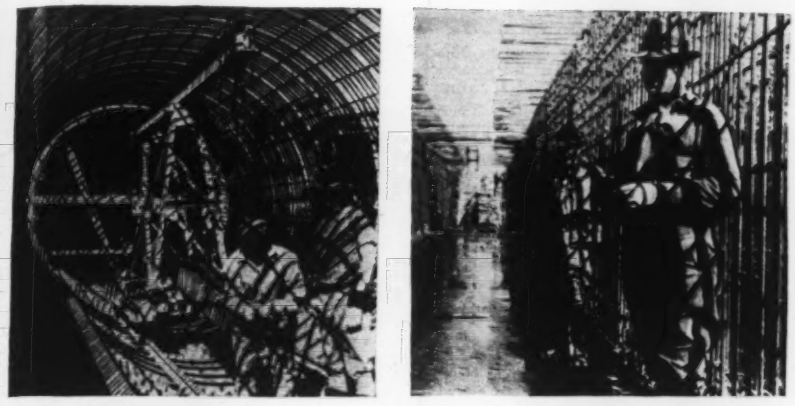


FIG. 8—SIPHON REINFORCEMENT being erected (left) for circular section and (right) for three-box section.

Fig. 3, and the accompanying table gives the features of the siphons in each group. Sections A and E consist of tunnel and cut-and-cover conduit through hilly and mountainous terrain. Sing'e- and double-barrel circular siphons provide for crossing drainage channels, washes and other depressions. The major portion of sections B and D is concrete-lined canal traversing gently sloping desert land. Most of the siphons in these sections are of three-square barrel type, providing waterway for cross-drainage. Circular siphons provide crossing of natural depressions. In section C two 12½-ft. siphons cross low saddles in rock between lengths of cut-and-cover conduit. The longest siphons are: Casa Loma, 26,417 ft.; Freda, 15,540 ft.; and Lakeview Valley, 11,650 ft. The maximum pressure occurs in Eagle Lift siphon, reaching 153 ft. of head under normal conditions, which may increase to 163 ft. under surge. In Big Morongo the maximum pressure reaches 121, and in Little Morongo 120 ft. of head.

Engineering direction

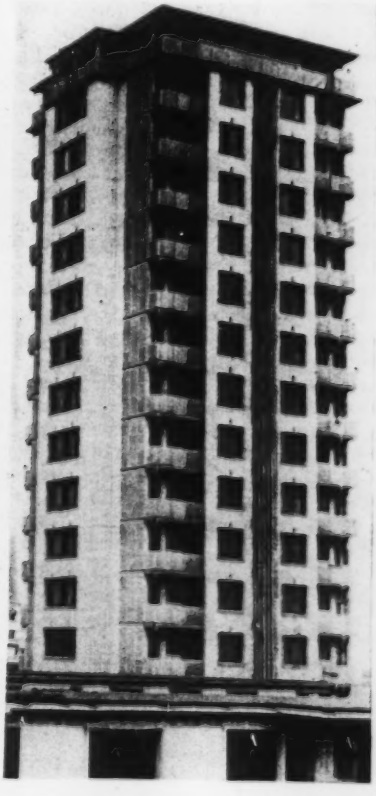
All engineering and construction of The Metropolitan Water District of Southern California are under the general direction of F. E. Weymouth, general manager and chief engineer; J. L. Burkholder, assistant general manager; and Julian Hinds, assistant chief engineer. W. C. Christopher, designing engineer, is in direct charge of the designing work.

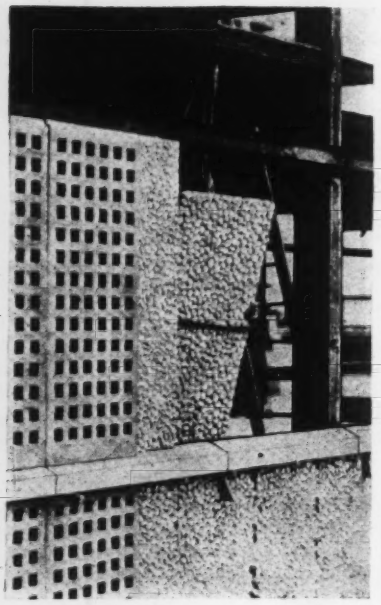
Tall Prefabricated Apartments Built in France

AN INTERESTING low-cost housing development, known as Cité de la Muette, at Drancy, in the outskirts of Paris, is described by P. Fillipi in *La Téchnique des Travaux* of November, 1934. Additional data will be found in *Schweizerische Bauzeitung* of Feb. 9, 1935. This project, which is now practically completed, occupies an area of 27 acres and consists principally of five blocks with a total of 1,200 apartments for workers' families. Each building block comprises a sixteen-story tower flanked by two rows of apartment houses, three to four stories high, enclosing a rectangular landscaped court about 250 by 65 ft. in area. These blocks, spaced 92 ft. apart, are inter-

FIG. 1—AERIAL VIEW of new apartment houses of Cité de la Muette, at Drancy, near Paris. Steel frames are used in the towers, but all walls and floors, as well as the framing on the low buildings, are of precast concrete units.

FIG. 2—PERFORATED concrete slabs around balconies and in the walls of laundry drying rooms give the towers a distinctive appearance. The vertical pipe grill of concrete tubes masks and supports a spiral fire escape.





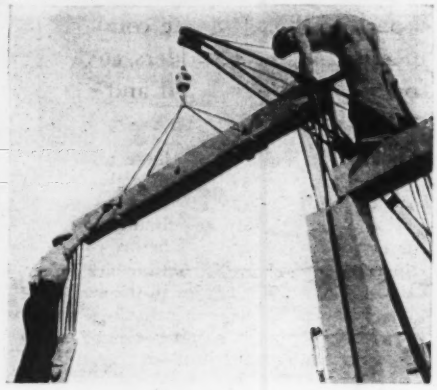


FIG. 3—ERECTING precast concrete members in French apartment development. Left: setting a wall section adjacent to the perforated units, which inclose the laundry drying room. Center: lowering a precast concrete beam into position on the precast column; joints are made monolithic by poured concrete. Right: setting precast column units around the vertical reinforcing steel; the two are bonded together by poured concrete.

connected by underground passages and are served by an adjoining common group of utility plants, including a booster pumping station, a refuse incinerator and a central steam-heating plant discharging its smoke through one of the towers.

There will be several more groups of four-story and five-story buildings, an educational center, parks with playgrounds and an athletic field, according to present plans.

The towers are divided into small apartments of two and three rooms. The larger apartments of four and five rooms are in the lower buildings. Each apartment has a balcony and a drying room built of perforated concrete slabs, 1.6 in. thick (Fig. 2).

The buildings were practically all assembled of standardized prefabricated members. The steel frames of the towers, piping and fixtures were ordered from near-by plants, but all the concrete framing of the lower buildings, all walls, partitions, floor slabs, etc., were made of light precast concrete units, manufactured in a temporary plant adjacent to the site.

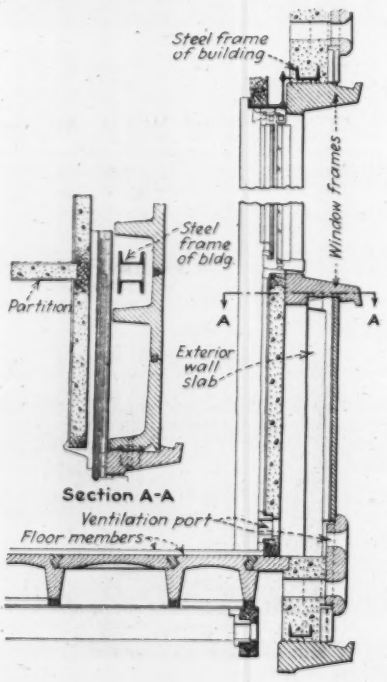
Fig. 4 shows the cross-sections of the principal precast members as follows: (1) two types of floor members, which were cast in standard length of 5 ft. 2 in.; (2) T-shaped outer wall slabs, 12 in. wide and 10 ft. long; (3) rabbeted interior and partition wall slabs 2 ft. wide and 10 ft. long, cast of cellular or slag concrete and dressed with plywood boards framed in ordinary lumber; and (4) monolithic concrete window frames, 5.25 ft. square. Air spaces in the outer walls are ventilated by means of round and oval ports. Bolt holes were provided in the floor and wall slabs for plumbing and electric installations. The walls are made of cellular heat-insulating concrete dressed with boards of "marble" concrete, requiring no plastering and no painting. The weight of the walls is 37 to 41 lb. per sq.ft., and of the finished floors 27 to 31 lb. per sq.ft. Each tower foundation rests on 106 patented concrete piles; 28 of these are inclined at an angle of 20 deg., the rest are vertical.

Stairways, kitchens and bathrooms were done in a patented resistant alumina composition, glassy, shiny and of blue color. Living rooms and bedrooms were finished in plywood. Floors were covered with tiles made of a magnesia composition. Spiral fire escapes along one side of each tower are carried, and incidentally masked by a semi-circular cage consisting of nine vertical concrete bars.

All reinforcing steel was welded. Concrete was conveyed in hand trucks to vibrating casting tables, where it was placed in metal forms that were carefully washed and sprayed with oil. Concrete castings were carried in their forms, by two men, to the curing sheds, where the forms were removed and the casting stamped with the worker's initials and the date of casting. When necessary, the castings were trued and polished with an electric surface grinder. Vibrated cast concrete, containing 507 to 591 lb. of cement per cubic yard, tested 7,820 to 8,530 lb. per sq.in. in compression.

Since no member weighed over 220 lb.,—the maximum weight for floor slabs was only 55 lb.,—the erection plant was light and simple, with no heavy derricks, no falsework and no forms. It took 5½ months to build a four-story block with a total floor area of 58,000 sq.ft. Cost of materials amounted to 3,157,000 francs, including an erection cost of 648,000 francs.

FIG. 4—STRUCTURAL DETAILS indicating the types of precast units which comprise the walls and floors of the new apartment houses at Drancy, near Paris.



Large Rivet Standards

A proposed American standard for large rivets of ½-in. diameter and larger has recently been completed by a committee of the American Standards Association. It represents a second revision of an earlier proposed standard, dated October, 1928. Copies of the proposed standard are available from the American Society of Mechanical Engineers, 29 West 39th St., New York.

Low-Cost Roadbuilding

—*A Symposium*

Accounts of experience and practice condensed from recent papers presented at meetings of roadbuilders covering federal standards, farm service, oil mix, stabilized soil and tar-retread road practices

DEFINITE PROVISION for secondary roads in the federal grants of 1933 and 1934 for emergency roadbuilding has lifted the low-cost road to higher significance than it has ever before had for federal and state highway administrations. Again the increasing absorption of county roads into state systems and of township roads into county systems, with wider extension of state aid to counties and towns, have brought low-cost road structure and construction more directly under skilled engineering consideration. Out of these changes a technique of low-cost road improvement is crystallizing, and these new practices are being subjects of discussion before roadbuilding associations. From these discussions selection has been made of half a dozen for condensed summary in the following pages.

Federal Secondary-Road Standards

By C. N. Conner

Senior Highway Design Engineer, Bureau of Public Roads, in a paper presented before the American Road Builders Association

THE RULES governing the expenditure of the two federal grants aggregating $600,000,000 for roadbuilding provided that not less than one-fourth should be expended on secondary roads. In selecting and planning these roads it was the policy of the Bureau of Public Roads not to require higher construction standards than were reasonably necessary for the volume and weight of traffic served. The minimum design standards called for:

1. A graded width of roadbed, in easy topography, of not less than 26 ft. out to out of shoulders, and in rougher topography 24 ft. out to out of shoulders, with an absolute minimum width of grading of 20 ft. over all in mountainous country.

2. An alignment involving no sharp turns and other features likely to be dangerous for the anticipated volume of traffic.

3. A minimum surfacing width of 10 ft. for single-track roadways, a minimum of 14 ft. for an estimated maximum of daily traffic of 250 vehicles; and a minimum of 16 ft. for an estimated maximum traffic in excess of 250 vehicles.

The improvements planned on 25,479 miles of highways and streets in projects approved to Sept. 30, 1934, are classified by types as follows:

Type	*Miles*	*Per Cent*
Graded, preliminary to surfacing	5,609	22.0
Low-type, sand-clay, gravel, macadam, low-cost bituminous mixes	14,022	55.1
High-type, bituminous macadam, portland-cement concrete, brick	5,847	22.9
Total	25,479	100.

Among leading technical developments have been: (1) classification of subgrade soils into their respective groups and an understanding of their respective behavior have made it possible to apply appropriate treatment to them or to construct base courses to fit the soil conditions and to design appropriate low-cost surfaces; (2) considerable progress has been made toward the selection of a few types of bituminous materials best suited for low-type construction and also toward the development of a more uniform system of testing and specifying such materials; (3) the development of new special equipment for low-cost construction such as rubber-tired blade machines, various types of drag-mixing machines, finishing machines, ironer rollers and portable mixing plants has accompanied the development of the low-type surface.

Land-Service Roads for Sparse Population

By George D. Tramp

Superintendent, Dickinson County Road Commission, Michigan, in a paper presented at the Annual Conference on Highway Engineering, University of Michigan.

THE Holbeck-McNitt Act passed three years ago by the Michigan state legislature provided for the absorption over a period of five years of all township roads by the county system. At present 80 per cent of the township roads have been taken over by the counties. The improvement of these roads in the counties of the upper peninsula is discussed in this article.

FIG. 1—FARM-SERVICE ROAD in sparsely settled country being widened and drained; in this northern country grading trucks and wagons were loaded by hand with a tractor to move large boulders. With 6 in. by 16 ft. gravel surfacing these roads in Michigan cost about $4,000 a mile.

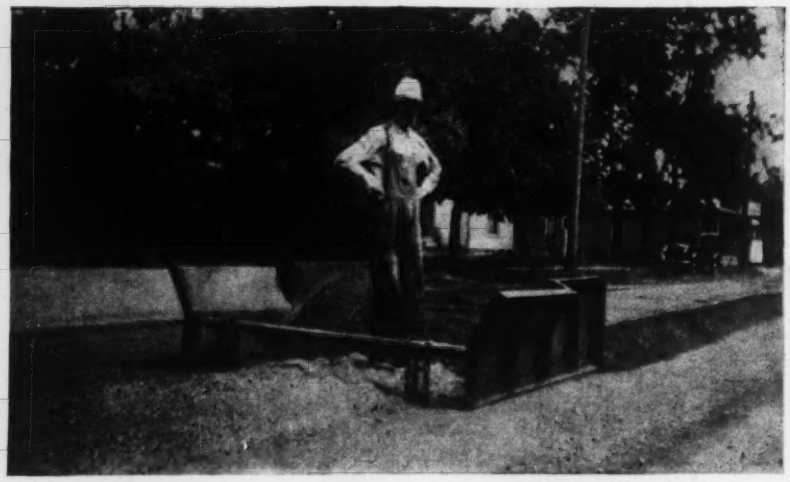


FIG. 2—MEASURED AGGREGATE for road mix secured in Dickinson County, Mich., by a distributor hauled by the aggregate truck and discharging the load in a windrow of uniform size.

FIG. 3—EVEN ROAD MIX secured in Dickinson County, Mich., by systematic blading with power graders. A 3-in. by 20-ft. oil-mix surfacing is costing about $1,500 a mile.

Only a small percentage of the township roads was improved previous to adoption. Most of these roads had narrow and steep grades, inadequate drainage and right-of-way fences—in many cases, 1 rod from the center line. These fences quite often were fieldstone that must be hauled away. Considerable surfacing was required to make these roads usable twelve months per year.

Right-of-Way—Securing the 4-rod right-of-way, previous to improvement, has given the counties some trouble. Sufficient funds are not available to purchase right-of-way. In most cases a quit-claim deed or easement was secured by building new fences for the property owners on the new right-of-way lines. Where the right-of-way was not donated, this section of road was passed by in the improvement. Later, the property owner who saw the improvement on each side of him was willing to cooperate to secure it in front of his place. Right-of-way fence, built of four strands of barb wire with 4-in. posts set on 8-ft. centers, cost 4½ to 6c. a foot.

A 66-ft. right-of-way had to be secured to build wider grades than were built under the township system. This winter has justified the wider roadbed, which gives snow storage and sufficient width for two cars to pass. Snow removal costing as high as $300 per mile in the copper country can be attributed, in part, to old narrow grades and lack of snow-storage space.

Grading Practice—Slope staking is done only where heavy grading is encountered. Center-line surveys are usually necessary when the improvement is on subdivision lines and right-of-way descriptions are needed. Most counties are now mapping these roads of which there was never a plan or description.

Contract construction has not been employed except in a few instances. Most of the grading is done by force-account and welfare labor. Although most counties have gas shovels, considerable grading is done by hand labor, teams and wheelers. Considerable mileage has been widened by the use of tractors and rotary scrapers followed by the heavy grader. The rotary scraper is a very useful tool in this type of construction. Stone fences have been removed by hand, loaded into trucks or wagons and placed in low spots in the grade, wasted in old ditches that will be covered later, or placed on fill sections. Accurate costs per mile for grading operations are not available due to the extensive use of welfare labor. Some figures received give costs for grading a mile of road as low as $1,000. In heavier work, where trucks are needed to haul dirt, costs per mile were between $1,500 and $2,500.

Bridges and Culverts—The installation and replacing of culverts and small bridges are among the costly items. Some counties now take bids on their yearly culvert requirements. Culverts purchased in this manner, in carload lots, offer great savings. Two counties are making their own reinforced-concrete pipe. It is interesting to learn that this type of pipe, which will pass the state highway department specifications, costs one county as follows: 12 in., $0.41 per ft.; 18 in., $0.74 per ft.; and 24 in., $1.51 per ft.

One county estimates that one mile of road requires about 200 ft. of 18-in. to 24-in. corrugated metal culvert at $1.50 per foot, which would cost $250. The same mile would require eight driveway culverts 16 ft. long, 15 in. in diameter, amounting to 128 lin.-ft. at $1 per foot, which would cost $128. The total cost of culverts is $378 per mile.

In the construction of small bridges the use of native timber for piling, stringers and caps is general. Paint coats of creosote are used. In some of the mining communities, salvaged steel has been used for deck construction, and either a concrete or a plank floor has been placed thereon.

Surfacing Methods—A great proportion of the mileage must be surfaced to make it passable during wet weather. Some counties have been placing 1-in. crushed gravel on those roads that are close to their crushing plants, at a cost of $1 per cubic yard, up to a 5-mile average haul. Most counties have used pit-run gravel exclusively from which the larger stones have been removed by a grizzly or have been raked off the road after placing. The use of mechanical loaders and shovels for loading is quite general. Under CWA and ERA considerable material has been loaded by hand. The gravel placed is usually one course, 6 in. thick, 12 to 16 ft. wide. The usual royalty on gravel is 5c. per cu.yd., loading 5c. per cu.yd., and hauling 7 to 10c. per yard-mile. Pit-run gravel has been hauled for about 50c. per cu.yd. up to a 5-mile average haul.

In Baraga, Houghton, Keweenaw and Ontonagon counties, considerable mileage was surfaced with stamp sand, a waste material from the stamp mills where the copper-bearing rock is crushed. The sand-clay surface built by these counties is excellent and provides

a good all-year surface at low cost. The nearness of material usually governs whether stamp sand or gravel is used.

Using figures received from the various counties, an average road cost for the Upper Peninsula may be arrived at as follows:

Right-of-way, fencing	$ 600
Grading	2,000
Ditching	500
Drainage structures	250
Pit-run gravel	600
Average cost per mile	$3,950

The lowest cost per mile reported was $2,370 and the highest $5,000.

Oil-Mix Surfacing Methods and Costs

By W. J. Slavin

County Engineer, Livingston County, Mich., in a paper presented at the Annual Conference on Highway Engineering at the University of Michigan.

BEFORE placing new aggregate on the road, the surface should be well bladed with a heavy grader, to remove all corrugations and provide a smooth hard surface.

All loose material should be scraped into a windrow, and enough new material added to make up the required amount for the width and depth of surface under construction.

In 1931 the writer designed a measuring device for the purpose of accurately measuring the aggregate in a windrow as it is placed on the road. It consists essentially of a rectangular box, or hopper, into which the gravel is dumped from the trucks. As it is pulled forward by the truck an adjustable opening in the rear lets out the exact quantity of material required for the job and leaves it in a uniform flat-topped windrow 6 ft. wide. The salvaged material is measured along with the new aggregate, and the total volume of material is under definite control.

Our construction cost on oil mix has averaged $1,612 per mile for 20-ft. width and 3-in. loose depth, or 13¼c. per sq.yd. Our average cost in 1934 was $1,530 per mile.

Stabilized-Surface Methods and Costs

By John H. Barr

Road Engineer, Oakland County, Mich., Road Commission, in a paper presented at the Annual Conference on Highway Engineering at the University of Michigan

IN 1932 a section of the Andersonville road, 3 miles in length, was selected for experiment with stabilized soil surfacing. The gravel and clay were added and mixed in the correct proportions, and a tightly bound surface was produced. Light applications of calcium chloride were spread occasionally during the next season to maintain a comparatively dustless surface. The experiment was successful enough to warrant further trial of stabilization on roads of heavier traffic than that on the Andersonville road, which carries about 300 vehicles per day. A continuance of a stabilized-surface program saw the completion of 25 additional miles in 1933 and 22 more miles in 1934. The program for 1935 includes 20 miles of stabilization.

FIG. 4—STABILIZED SOIL surfacing in Oakland County, Mich. Gravel windrows at sides are spread, and clay windrow at center is bladed evenly over gravel. Blade mixing, with calcium chloride and water, follows in a fixed sequence of operations.

Preliminary Investigation—The first steps in the construction of stabilized roads is locating adequate material in proximity to the various projects. Oakland County is blessed with gravel deposits, so that the problem of soil location resolved itself into one of obtaining the required quality and quantity of clay. During the 1933 and 1934 season only three large deposits of satisfactory clay were located, and these were at extremities of the county, necessitating many long hauls.

It is not intended to go into a discussion of clays other than to say that these clays best suited for this work in our county had a plasticity index of 18 or more. The plasticity index, or P.I., is a measure of the stickiness and binding property of the clay. This test is performed on the screenings passing a No. 40 sieve. The test is used for comparing clay properties, and also for determining the binding property of the fines in stabilized gravels.

When the soils have been located, tests are made in our soils laboratory to determine the advisability for use in stabilization. Screen analyses are made of both clay and gravel, and the percentages passing a ½ in., a No. 4, No. 10 and No. 40 sieve are determined. The material passing the No. 40 sieve is saved, and the P.I. test is made on this fraction. When the tests have been completed, the pits are then designated from which the materials are to be used.

Method of Construction—It has been found convenient to work each project in half-mile sections, and the method used is as follows:

1. All loose material on the roadway is windrowed to the center.

2. Enough new material is added to the windrow to bring the total quantity to approximately 1,000 cu.yd. per mile. This is done by measuring the windrows. This quantity, when stabilized, will produce a wearing course 3 in. in depth and 20 ft. in width.

3. Clay is then delivered and windrowed on each shoulder in sufficient quantities to produce a stabilized mix of the desired P.I., the quantity having previously been determined by test in the soils laboratory.

4. As soon as the clay has become dry, it is spread out, pulverized and bladed back into its original position on the shoulders.

5. The gravel windrow from the center is then spread between the rows of clay, and the pulverized clay is spread uniformly over the gravel. Calcium chloride is then applied at the rate of 4 tons per mile on top of the clay.

6. The mass is then thoroughly mixed by blading, and after mixing it is split into windrows on each shoulder of the road.

7. The base is then uniformly moistened from water tanks, and a small amount of the mixed material is bladed from the windrows onto this surface. This is then similarly moistened and covered as before, and these operations are repeated until all of the dry material has been placed. During this process traffic has been allowed to travel over the bladed material, and compaction has been started. When all the material has been placed and a crown of not less than ½ in. per foot has been established, the surface is smoothed and traffic is allowed to continue compaction for a period of 24 to 48 hours before the final smoothing takes place.

There seems to be quite a difference of opinion concerning the amount of

FIG. 5—SPRINKLING is a studied operation in stabilized soil surfacing in Oakland County, Mich. An average of 40,000 gal. of water per mile was used in 1934, carefully applied with sprinkler trucks.

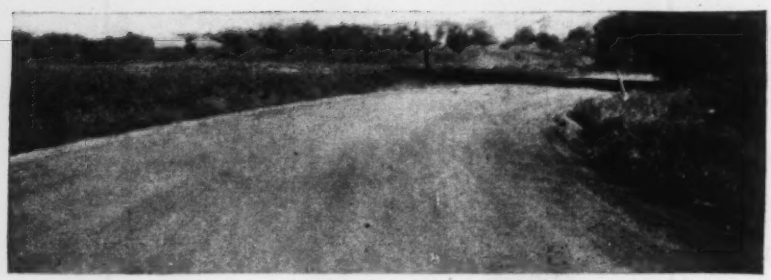


FIG. 6—STABILIZED SOIL ROAD in Oakland County, Mich.; a 3-in. by 20-ft. surface costs on the average about $1,650 a mile for construction and $320 a mile for maintenance.

water necessary in laying this mix. Too many factors enter into this operation, in our opinion, definitely to set a required amount. We have used as low as 7,000 gal. of water to as high as 30,000 gal. of water per half mile. These are extremes. The average, per half mile, however, has been fairly high during 1934, amounting to about 20,000 gal. This quantity was required with only a 1,000-gal. tank truck operating. Two such tank trucks will cut this amount of water considerably, as less evaporation takes place.

8. After this consolidating period, a patrol grader makes the final smoothing of the surface. By this time a slight amount of loose material has usually developed. The surface is then sprinkled just enough to allow traffic to compact the loose material and incorporate it into the surface. When, because of cold or wet weather, calcium chloride has not been included in the mix, it is then applied to the surface at the rate of 3 tons per mile.

Plant Mix—Plant-mix stabilization, of which we have done a small amount, varies only in that clay and gravel are combined at the pit wherever possible. Most of the Oakland County gravel pits are free from clay. However, one of the county gravel pits was covered with a 6-ft. layer of clay having a P.I. of 16. No special equipment was used to segregate and add the clay to the gravel in correct proportions. However, by means of hand spudding and by careful manipulation of the dragline, a fairly good stabilized mix was delivered from the screening plant. A one-mile project was built from this pit in which the material was mixed at the plant. Tests indicated that closer control was desirable, and an effort was made to improve the composition at the pit. On additional mileage built from the pit it was necessary to add a small amount of the strippings from the pit, on the road, to secure the desired fines.

The work that has been done on the study of plant mix warrants further investigation. Tests have been made that indicate that mixtures of waste strippings that contain low P.I.'s mixed with graded pebble will produce a stabilized mix. There is every reason to believe that very soon a plant mix will be produced that will eliminate all the operations of hauling clay, pulverizing, mixing and sprinkling in place. This will result in a considerable saving of time and in a lowering of the cost.

Costs—Costs per mile of construction have varied from one project to another, depending on the quantity and quality of soils to be stabilized, as well as the length of the hauls. The total average cost per mile of projects 3 in. in depth and 32 ft. in width, including gravel, clay, machine work and calcium chloride, has been $1,650. Average costs of clay have been $1.50 per cu.yd. spread on the job, and for gravel $1.05 per cu.yd. delivered. Gravel is produced by regular pit equipment, while clay is produced by hand labor. Water costs have averaged $50 per mile. The cost of the finished wearing course per square yard mixed in place has averaged 14c. Our plant mix showed a slightly lower cost, about 12c. per sq.yd., or a saving of about $200 per mile.

Costs of maintenance on seven projects for 1934 have varied from $265 to $415 per mile. The average cost per mile for 18 miles has been $320. This includes equipment rental. Although these costs are comparatively low, it is hoped that with the experience of the past year and with the various changes made in construction and specifications during the latter part of 1934, even lower costs will result.

Bituminous Retread Surfaces

By O. S. Hess

Engineer Manager, Kent County Road Commission, Grand Rapids, Mich., in a paper presented at the Annual Conference on Highway Engineering at the University of Michigan

IN KENT COUNTY every road is put through a process of rebuilding and widening a year in advance of any bituminous surfacing work. Nearly all of the old roads consisted of 24-ft. grades with varying widths and thicknesses of gravel surfaces. These grades were widened to 36 or 40 ft. in most cases, and the gravel surface was made 21 ft. wide and at least 6 in. thick compacted. The new gravel was compacted by the use of tamper rollers and was then maintained continuously with truck scrapers until the following season. Ordinarily the road should be sufficiently consolidated by this time to take a bituminous surface satisfactorily.

In determining what thickness of retread should be placed, in each case we have followed the plan of making observations on the road by driving over it a number of times during the spring break-up. In any particular case, if no breaks occurred in the surface during this period and there were no soft spots, we would conclude that a drag surface-treatment type of surface would be sufficient. If soil and drainage conditions and the appearance of the surface during the spring break-up made us skeptical of so thin a surface, we would probably decide on a 1½-in. retread. In other cases, where the road showed frost boils with quite a number of breaks

FIG. 7—SPREADING STONE on one side for 3-in. retread surface in Kent County, Mich.; retread machine has just made first mixing trip on other side.

in the surface, we would probably decide on a 3-in. retread. We would not make it thicker than 3 in. because of the seeming impossibility of constructing mixed-in-place surfaces greater than 3 in. in thickness with the equipment now available.

Regardless of the thickness of the surface, the methods of construction are the same as far as the preparation of the base and the placing of the prime coats are concerned. As soon as the spring rains are over and it becomes necessary to place dust layers is about the right time to start bituminous work. This is usually about May 1. At this time the weather and temperature conditions are usually fairly satisfactory.

Prime Coat: First Step—The first step is to place a prime coat on all of the roads included in the bituminous program. As soon as the prime coat has been placed, of course, the dust nuisance is ended, and we have practically all the advantages of paved surfaces from then on. This not only furnishes the public with better driving facilities immediately but avoids the necessity of large expenditures for calcium-chloride dust layers, which would otherwise be necessary if the prime coat are placed later in the season. In placing the prime coat, all of the loose material is scraped to the edges of the road, leaving a practically perfect surface in smoothness and crown. The bitumen is then applied 20 ft. wide at the rate of about 3/10 gal. per sq.yd. For this purpose both light tars and cutback asphalts have been used, using the same quantities of each. Both materials have given good results. After this bitumen has been allowed to soak in for perhaps a half day, the road can be opened to traffic. It is usually advisable to go over the road just before opening it to traffic and blot up any wet spots with a little additional material, which can be taken from the loose gravel that was scraped to the edges. As a rule, this prime coat will handle the traffic satisfactorily without damage to the surface for a period of two or three months. In any case, it is probably advisable to allow traffic to use the road at least a week or two before proceeding with the next step.

Bladed Prime Coat: Second Step—This next step might be called an auxiliary or bladed prime coat, and is not absolutely imperative. It is believed to be advisable, however, because of the additional smoothness obtained for a very small cost. The loose gravel that had previously been scraped to the edges of the road is now scraped back on to the primed surface and spread evenly over the 20-ft. width. If there is a lack of material in occasional spots, it is advisable to add a little gravel on these particular spots so as to furnish a practically uniform coat of material the whole length of the road. This added material may be pea gravel, stone chips or just ordinary maintenance gravel. As the loose material on the surface also contains considerable dirt, it is necessary to use a light bitumen for this treatment. It is felt that a light tar is the best material for this particular purpose. The bituminous material, which is the same as that used for the first prime coat, is now applied at the rate of about 2/10 gal. per square yard. The loose material is then bladed by truck scrapers until it is all thoroughly coated and is then again spread out evenly over the surface and rolled. As soon as the surface has been rolled, it can be opened to traffic. It will be found that this bladed prime coat has added considerable stability to the base and has produced a surface that is almost perfect for smoothness.

After the double prime coat has been completed as described, the road is capable of satisfactory traffic-handling the rest of the season, and in many cases would even go over into the next season with no serious breaks in the surface. It is always advisable, however, either to surface-treat this road during the same season or else to place retreads of thicknesses that are suited to the particular roads in question. It is found that many of the roads can be completed satisfactorily by simply placing a proper drag-surface treatment without any other material between the double-prime and the surface treatment. Whether or not a retread is placed, the surface-treatment work is the same and will be described later in connection with the surface treatment on retreads.

Retread Mix—In general, retreads have been either 1½ or 3 in. thick. In placing the stone a stone spreader was used to obtain a surface with uniform thickness. It should be borne in mind that when a retread is mixed with the multiple-blade-type retread paver the surface necessarily widens somewhat with each round trip of the machine. It is, therefore, advisable to place stone on the ground about 18 ft. wide if the finished surface is to be 20 ft. in width. The bituminous material may then be placed 18 ft. wide, and the mixing process started. On retreads as thick as 3 in. it is advisable to handle each half of the road separately, so that the application of bitumen and the mixing process may be carried on at the same time that stone is being hauled and

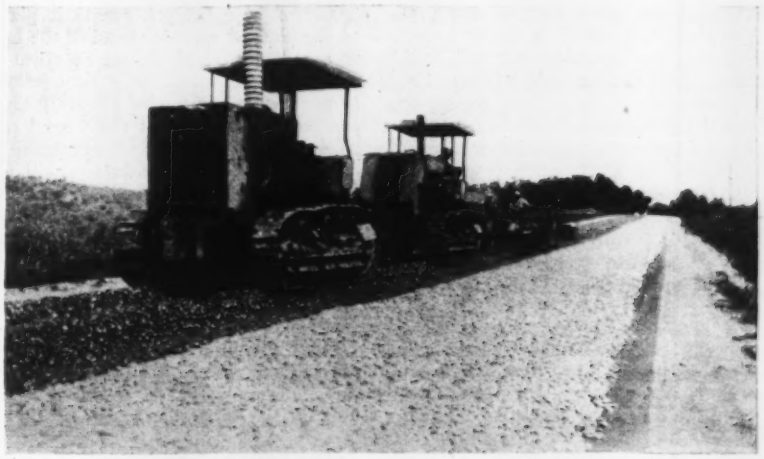


FIG. 8—RETREAD MIXING OUTFIT at work in Kent County, Mich.; half width being mixed while stone and binder are being applied on other side.

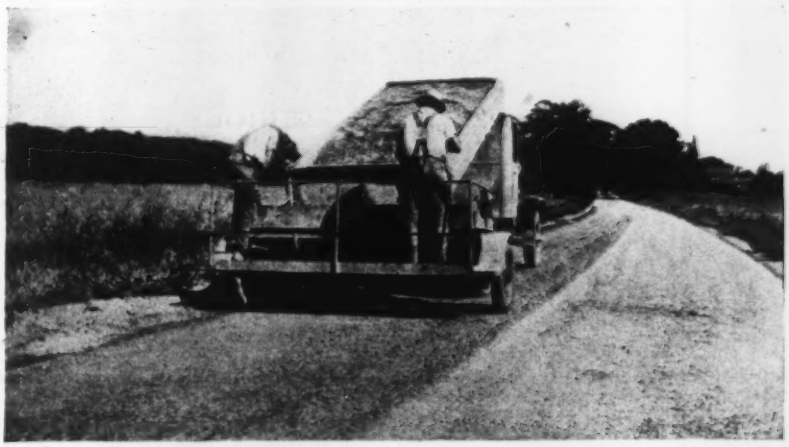


FIG. 9—DRAG SURFACE TREATMENT with pea gravel is employed for fine-surface finish in Kent County, Mich.; truck is spreading thin layer of pea gravel.

placed on the other half of the road. This plan will effect a little greater efficiency on the work and will avoid taking the chance of having long stretches of road rained on during the construction process.

The bituminous material is applied at the rate of 6/10 gal. per sq.yd. for 3-in. retreads, or 4/10 gal. per sq.yd. for 1½-in. retreads, and the retread machine follows with the mixing process as closely as practicable. A medium tar or cutback asphalt is used at this time. In general, the bituminous material used in the mix should be about as heavy as can be handled properly in summer weather. Care should be taken, however, not to use a bitumen that is a little too heavy, or else great difficulty will be experienced during the mixing and laying out process.

In doing the mixing with the retread machine it has been found advantageous to make the first round trip with the tail gate up. This does just as good a job of mixing and requires much less power. On the second round trip the tail gate should be placed so as partly to level off the material, but no attempt should be made to leave a perfect surface until the third or last round of the machine. In this case the tail gate should be set so as to leave the stone spread out uniformly to the proper thickness and crown, and care should be taken on this last round to bring the material exactly to the 20-ft. point or proper edge line. With sufficient experience it will be found that the crew will be able to do this very nicely and that no hand work whatever will be needed to leave the stone the proper thickness, crown and width, and with good straight lines on the edges.

The retread mixture is next given one longitudinal rolling. A 10-ton tandem roller has been used for this purpose. After the surface has been rolled once, a heavy bituminous material is applied at the rate of 3/10 gal. per sq.yd. for 3-in. retread, or 2/10 gal. per sq.yd. for 1½-in. retread.

After the rolling has been completed, the road can usually be opened to traffic again. If the weather is quite hot, it is sometimes advisable to keep the road closed an additional day at this stage of the work. Traffic should use the road at least a week or two before going on with the surface treatment.

Drag-Surface Treatment—The most simple method of completing the job is to place an ordinary hot seal by applying a heavy bituminous material on the road of about 3/10 gal. per square yard, covering it with about 25 lb. of pea gravel or chips, followed by rolling. This would effectively seal up the surface but would not materially add to the smoothness. As present-day traffic is becoming increasingly more critical of the riding qualities of our highways, it is believed advisable to finish these retreads with drag-surface treatments to obtain more smoothness.

In this case the pea gravel is placed on the retread surface ahead of the bituminous material at a rate of about 25 lb. per sq.yd., or it may be advisable to use a combination of about 20 lb. of pea gravel and 5 lb. of clean sand such as is used for the fine aggregate in concrete work. This mixture will furnish a little tighter surface and one that is less liable to ravel or scale in cold weather. In placing the pea gravel it is advisable to use some kind of machine or chip distributor, which will insure a uniform distribution of the material over the surface.

Next the bituminous material is applied at the rate of 3/10 gal. per sq.yd., using the same grade of tar that was used in the retread mix and the grade of cutback asphalt that was used in the prime-coat work. The bituminous-coated pea gravel is then thoroughly bladed back and forth by truck scrapers until the stone base has been thoroughly smeared over with the bituminous material and the pea gravel has been thoroughly coated. Then it is spread out uniformly over the surface of the scrapers.

In doing the blading it is suggested that the material on half of the road be kept on that same side of the road all the time—in other words, do not scrape the material from one side of the road to the other, but simply turn it back and forth, keeping each half by itself. This prevents thick and thin spots in the final surface treatment when it is laid out.

After the mixed material has been laid out, properly washed sand should be applied uniformly over the surface at the rate of about 5 lb. per sq.yd. Then the whole surface should be thoroughly rolled again. This will complete the construction of the retread, and it may be opened to traffic practically as soon as the rolling has been completed.

It might be mentioned that in much of our work during the past season about 5 lb. of pea gravel was used on the surface just previous to rolling instead of 5 lb. of sand as above mentioned. Later it was found that in some cases this resulted in a surface that was quite porous and had a tendency to ravel when cold winter weather started. This tendency to ravel, however, was checked by applying 15/100 gal. per sq.yd. of heavy bituminous material on the surface about Nov. 1, followed by 2 or 3 lb. of sand. While this effectually checked the tendency to ravel, it was an additional expense that was avoided in some of the work by using sand in the manner above described.

Volume and Cost—During the past four years 40 miles of black-top surfaces have been built, consisting of ½ mile of oil gravel, 1 mile of 3-in. cutback asphalt retread, and the rest tar retreads and surface treatments of varying thicknesses. It is evident from these figures that experience has been limited largely to the use of tar as a bituminous material, the other types having been used in a limited way only.

As to the costs of the various types of retreads described, the drag-surface treatment type (which really amounts to a mat from ¾ to 1 in. thick) has cost 11c. per sq.yd., or from $1,300 to $1,400 per mile of 20-ft. road. The 1½-in. retread surfaces showed an average cost of 26c. per sq.yd., or about $3,100 per mile of 20-ft. road. The 3-in. retreads cost 40c. per sq.yd., or about $4,800 per mile of 20-ft. surface.

Stabilized Soil-Road Maintenance

By H. G. Sours

County Engineer, Summit County, Ohio, in a paper presented before the American Road Builders Association

ONE of the most important questions in connection with stabilized roads is to know what to do with them after they have been built. No loose or floating material should be carried on the surface during dry weather. This acts as an abrasive and tends under traffic to create raveling. Blading should be done only after rains sufficient to make the surface workable. Any attempt to blade while dry tends to loosen the top material; it also wastes the calcium chloride, which has been drawn to the surface by capillarity during dry weather.

During wet weather a small amount of loose aggregate may be bladed in and spread over the surface; this material will bind in and help to fill any small depressions. A small amount of the shoulder soil, if of a satisfactory quality, will help to bind the loose material when bladed over the surface. If the shoulder soil is not satisfactory as a binder, a small quantity of clay may be spread along the shoulder and held available for use at the proper time. When the surface again becomes dry, the excess loose material should be removed by lightly blading it off onto the shoulders. A combination of the cutting and building-up methods may often be used to advantage.

Patching of very slight depressions is not considered advisable, but the deeper holes should be filled. A mixture of 50 per cent graded gravel under ½ in. in size and 50 per cent sand-clay together with 100 to 150 lb. of calcium chloride per cubic yard will make a good patching material, according to recent experience.

Concrete-Placing Methods on Chicago Sewer Tunnels

Lining follows close behind excavation on all of intercepting sewers—Forms are collapsible steel ribs backed by horizontal lagging built up as concrete is placed—Top plant and shaft layouts

Last of Three Articles

CONTRACTORS on the various sections of 27 miles of intercepting-sewer tunnels under construction or recently completed in Chicago have developed methods of placing concrete lining peculiar to the tunneling conditions there encountered. The general concreting procedure is the same on all contracts regardless of size of tunnel, but of course variations are found on every section, first because of varying size and again due to the individual contractor's preference for certain details.

The scope, design and mining methods on Chicago's new intercepting-sewer tunnel system have been covered in two previous articles, published in the issues of June 13, 1935, p. 831, and June 20, 1935, p. 881.

Tributary to the West Side and Calumet treatment works, these tunnels total 27.2 miles in length and vary in size from 17x17 ft. to 4x5 ft. inside of concrete lining. This article describes the concrete-placing methods and form systems, concrete plant, grouting procedure, and gives an outline of general construction plant as installed by the various contractors.

General methods

Each contractor operates on a 24-hour schedule that allows 16 hours to excavate, trim and brace a predetermined length and 8 hours to set up forms and reinforcing steel and mix and place the concrete. The length of heading excavated daily depends upon ground conditions, but in no case is it more than can be mined out and lined with concrete in 24 hours. Progress, of course, varies, but in general the daily advance is 24 to 28 ft., though one contractor on a 9-ft. connecting conduit at Calumet plant maintained 32 ft. as a steady daily pace. Forms are struck after 48 hours.

Reinforcing steel is placed by the concrete crew, using precast concrete blocks as chairs in the invert. Invert bars bent up into the side walls provide a support for wall and arch steel, and the reinforcing cage is also wired to projecting bars from the previous concrete section, to the steel plate lining and sometimes to bars stuck into the clay at the face.

No form is required for the invert, which is placed very dry, tamped and screeded to the curved top shape. The top of the invert is left 1½ in. low, to receive a topping of rich concrete carefully screeded and floated to a smooth finish. Placing of this finish is the last operation in the tunneling procedure, done as the contractor retreats out of a finished tunnel, taking up the temporary floor and tracks, and cleaning the rough surface of the invert just prior to placement of the topping.

The invert is always placed full length of the excavated section before the side walls are started. Some contractors use the invert as support for the form ribs, others prefer to carry the ribs through brackets bearing on longi-

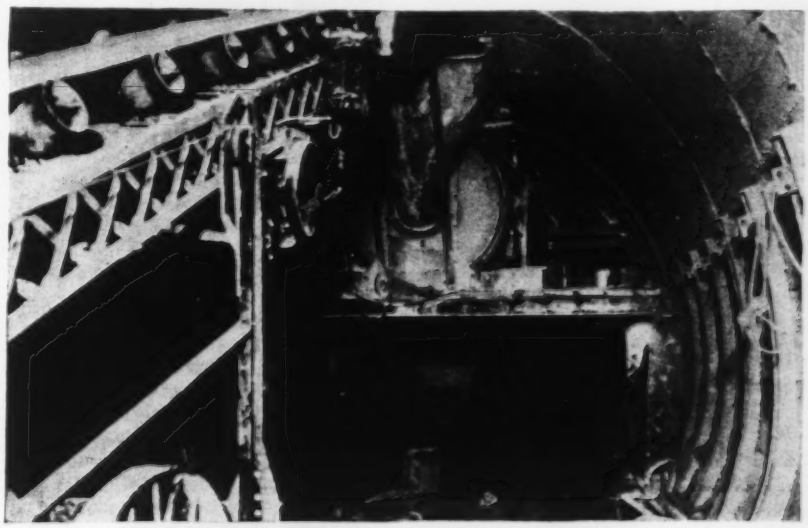


FIG. 1—PLACING CONCRETE LINING with an underground traveling mixer plant in a 17-ft.-diameter tunnel. The mixer is set high to permit muck trains to pass underneath. Aggregates belt is at the left and mixed concrete is carried to form chutes or to a shoveling platform by a high-level belt.

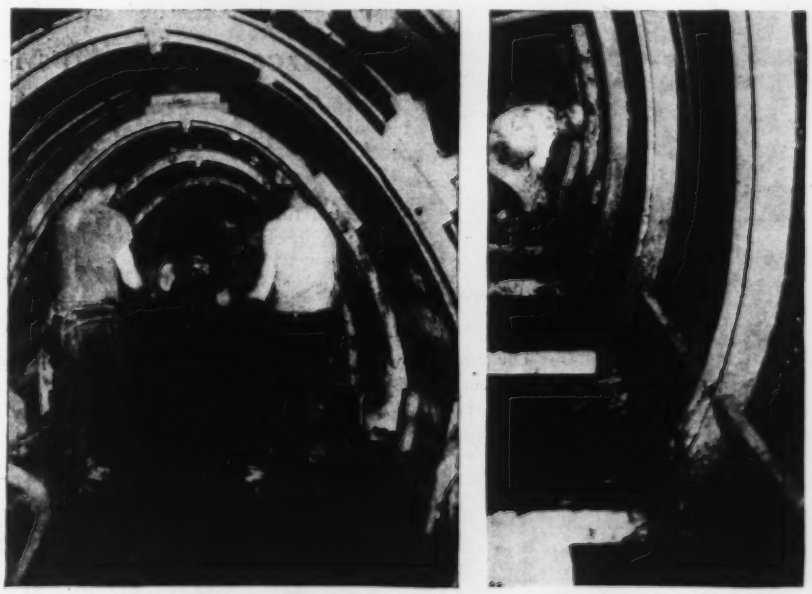


FIG. 2—SIMPLE FORMS of steel ribs and loose wood lagging universally used but differing in method of supporting the ribs, as (at left) by brackets carried by I-beam stringers and (right) by sills resting on the invert, with footblock struts placed as bottom spreaders.

FIG. 3—HANGING THE FORMS on a steel framework supported by the needle beam is favored by one contractor. Ribs are attached to cross-span braces, with longitudinal side beams acting as stiffeners.

FIG. 5—DESIGN of rib and lagging scheme permits passage of muck cars through the forms. The steel-plate key of the form system can be seen at the crown.

tudinal I-beams spanning the full length of the form sections and blocked up at each end.

On one 17x17-ft. section the mixer is down in the tunnel, close to the forms. On all other contracts the mixer is either at the top or bottom of the shaft, with mixed concrete hauled in cars. Except on the two 17x17-ft. sections all concrete is shoveled into forms by hand. On contract 4 an attempt was made to drill holes from the surface at frequent intervals, into which 6- or 8-in. pipe was placed, fitted with an airlock hopper at street level. Concrete was dumped into this hopper and blown down the pipe by high air pressure furnished by a portable compressor. This scheme was abandoned because of constant plugging of the pipe, probably due to the dryness of the mix.

Form design

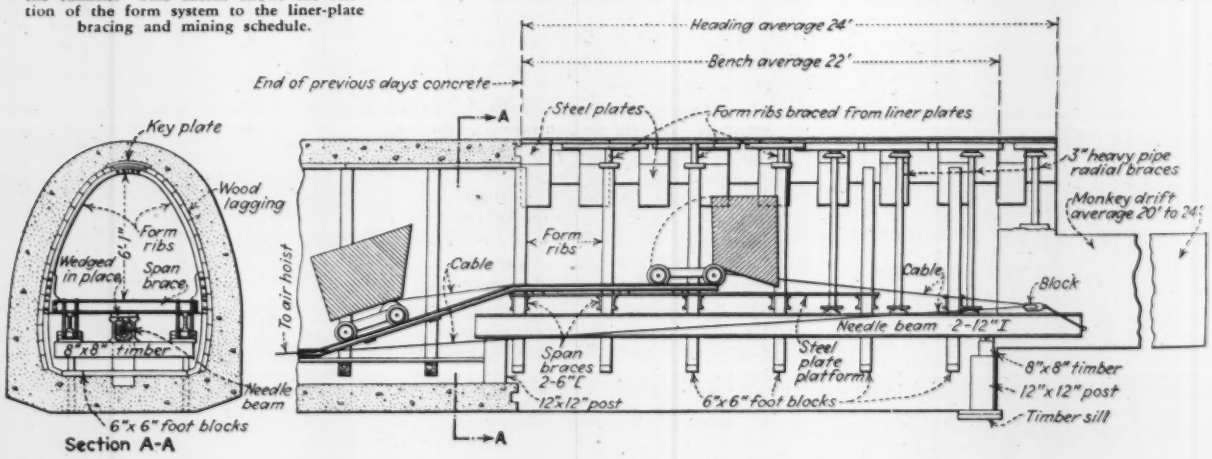
The form design, while extremely simple, is peculiar to these Chicago tunnels, consisting solely of channel ribs behind which longitudinal wood lagging is built up just ahead of the rise of concrete. Except for the method of supporting the ribs, the form system is identical on all sections of tunnel. Channel ribs vary from 5 to 8 in.; lagging is 2x6 to 2½x8 in. The ribs, spaced 4 ft. apart, are in two sections bolted at the top. Some contractors put a wooden wedge or block at the crown joint to facilitate stripping; others merely bolt the segments together and strike the form by knocking the ribs over at the top. Longitudinal angle braces bolt between the ribs, acting as spacers. On the larger sections each rib will carry a cross-strut, also bolted in place. Forms are completely knocked down in stripping, with the lagging carefully cleaned and oiled between uses.

In general, the forms are erected by setting the ribs on longitudinal planks or timbers placed on the invert concrete. These planks are set accurately to line and grade, to give the form its proper position. Transverse wood cross-struts or foot blocks keep the bottom from kicking in. On these foot blocks is laid a heavy plank floor, which remains in place until the tunnel is cleaned up, serving as a walkway and support for the tracks. With the foot blocks once set, it is a quick and simple job to complete the rib and bracing framework.

A slight variation in the support of the form ribs is found on contracts 5 and 6. Here the ribs carry steel brackets about 18 in. from the bottom end, which rest on longitudinal I-beams spanning through the form system. At the back end the I-beams rest on blocks set on the last invert section; at the front end they rest on the clay bench. Easier and more accurate form setting is claimed by this contractor as the reason for departing from the conventional system. With this system, the rib framework is set prior to placing of concrete in the invert. Concrete cars run into the invert area on tracks carried by low horses. The conventional wood floor is placed upon the finished invert. Figs. 2 to 5 show various form systems.

The use of the rib and lagging type of form on the entire tunnel system instead of the familiar traveling, collapsible type used elsewhere is due to several conditions. First of all, even though needle-beam bracing is not used in some headings, there is always the constant threat of a change of ground,

FIG. 4—USING THE NEEDLE BEAM as a form support is a variation from the conventional form system found elsewhere in the tunnels. This sketch shows the relation of the form system to the liner-plate bracing and mining schedule.



which would necessitate needles. Obviously it would be impossible to get the conventional type of form, with its interior bracing and solid shell into a heading already full of ground supports. Yet it is simple to erect the ribs between sets of jack braces. Then, too, a smooth inside finish of the tunnels is not required, so the marks left by the lagging are of no consequence.

Filling the forms

In general, concrete is brought into the headings in side- or end-dump cars, dumped onto the floor or onto steel plates, and shoveled into the forms by hand, keeping the fill level and at the same elevation on both sides. Lagging is built up behind the ribs as the concrete rises. An old shovel blade stuck into the fresh concrete is enough support for the lagging on the side walls until they begin to take a load. Wood lagging is carried up high on the arch but is replaced at the crown by steel plates 24 to 30 in. wide. These plates are set one at a time from one section, and the key concrete is shoveled onto the plate and rammed home.

The needle-beam bracing is removed as the concrete reaches the position of the radial braces. Occasionally it is necessary to replace a jack against the form, but usually the form ribs are sufficient to carry the ground load.

The wall and arch concrete is vibrated, either internally or externally (Fig. 6), sometimes both, in addition to being well spaded. This produces a dense concrete, with a surface free of honeycomb, even though the mix is fairly dry.

On contracts 3 and 4, the largest sections, concrete for the walls and most of the arch is placed by gravity from a high platform. On contract 3, where the mixer is in the hole, mounted on a traveling jumbo (Fig. 1), mixed concrete travels by belt conveyor to chutes leading to the side walls. Here the key is shoveled by hand.

On contract 4, two methods of concrete placement are in use. In the south heading the cars are pulled up a ramp by a hoist line to an elevated platform, from which concrete is chuted to the side walls. On the north heading a portable belt conveyor lifts the concrete to a high level. The fact that the contractor had this conveyor on hand was the only explanation given as to why it was used in preference to a ramp.

Mixing plants

Many variations of batching and mixing plants are found on the several contracts, from locomotive-crane-charged batchers to wheelbarrow plants, from 1-yd. pavers to little 7-S mixing units. In every case the contractor has ideally adapted his concrete plant to the peculiar conditions of his own job.

On contract 3, aggregates are received in railroad cars, unloaded and stocked by a locomotive crane, and loaded into the batcher bins by the same crane. Steam-heating of the stockpiles and aggregate bins was necessary in cold weather. The weighing batchers are elevated, to allow a narrow-gage train to run underneath. Bulk cement is used, unloaded by wheelbarrow and weighed in the batcher. On this job the mixer is in the hole, so a ¾-yd. proportioned batch is loaded into regular side-dump muck cars, dropped down the shaft and hauled to the heading. This is one of the three jobs using mechanical haulage. At the heading the cars are dumped into a hopper, and the batch is elevated to a ¾-yd. mixer by belt conveyor.

FIG. 6—VIBRATING FORMS with an air spade fitted with a tamping tool.

Identical plants have been installed on contracts 4 and 7. Here the mixers are set near the bottom of the shaft, with weighing batchers for sand and gravel overhead. Aggregates are dumped from trucks into bins set just below street level, with spouts leading to the batchers. Bag cement is used, dumped at surface level through spouts direct to the mixer. The mixers discharge directly into cars at tunnel level.

At contract 5 the aggregates were dumped in small stockpiles on the ground and loaded by clamshell bucket into heated steel bins with weighing hoppers over the two mixers at the top of the shaft. Cement in bags was stored in a housing over the mixer platform. The mixers discharged through a tube into steel dump cars at the bottom of the shaft.

At both shafts of contract 6, paving mixers are used, charged from trucks by batchers proportioned at a central point. From the mixers the concrete is carried down spouts direct to cars at the bottom. Because of lack of overhead clearance at the Wacker Drive shaft, the mixer is dropped into a cut in the lower drive level, and the mixer skip has been replaced with a hopper into which the batches are dumped.

Mixers are located at the top of the shaft on contracts 8 and 10. Materials are batched in near-by central plants, and delivered to the mixer in trucks with bag cement on each truck load, which is emptied into the batch at the mixer. Concrete is carried to the tunnel level through spouts.

On contract 9 the contractor took advantage of the tunnel location through little-used side streets and opened up several shafts for concreting operations, usually at manhole stations. Small mixers are used, charged by wheelbarrows, which are weighed over small platform scales. In cold weather, aggregates on this job are heated in the stockpile by fires built within large metal pipes.

The specifications require that all concrete shall attain a compressive strength of 2,400 lb. in 7 days and 3,000 lb. in 28 days. The average of the routine test cylinders taken every few days is above 3,000 lb. at 7 days and over 5,000 lb. at 28 days, with some samples running as high as 6,200 lb.

Specifications also require that grout pipes be placed through the crown at 8-ft. intervals. Grout nipples are placed through holes in the pressed-steel liner plates, and extend into the tunnel through holes in the key-form plates. Grouting follows from 100 to 200 ft. behind the concrete placing.

In general, the conventional air-operated horizontal or vertical grout pumps are used, but two contractors have adopted another piece of equipment for this purpose. They have converted a regular Cameron steam piston pump into air-operated grout machines without much change. Pump cylinders wear out in two months or so but are easily replaced.

For the regular grout pumps, sand and cement are brought into the tunnels in bags. One contractor using a Cameron pump mixes the grout in the concrete mixer, in alternate batches along with the key concrete, when concreting is naturally slowed up. Grout is dumped into a small hopper connected to the intake of the pump. The other contractor using the force pump mixes his grout in an open narrow box set above the pump.

Top plant and shafts

In most cases the top plant and shaft are located on private property adjacent to the tunnel line, requiring a connecting tunnel between the shaft and the sewer. Except for contract 9, where compressed air has not been used in the tunnel so far, all sections are equipped with stationary compressors installed in fireproof houses. On Section 9, portable compressors supply what air is required for tools and for grouting.

All compressors are electric driven, connected with two sources of power.

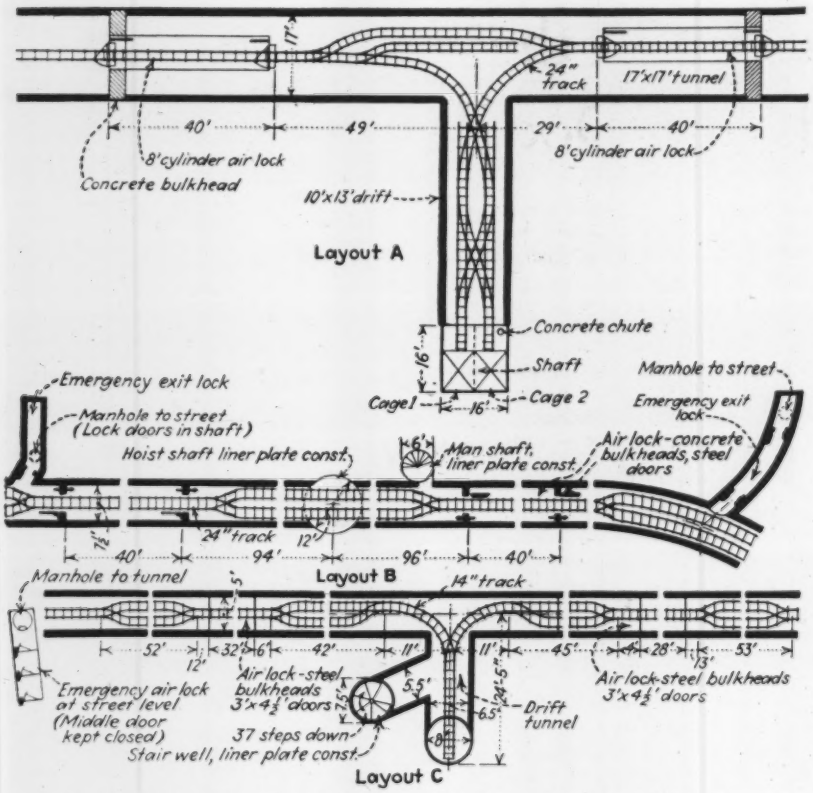


FIG. 7—SHAFT AND LOCK LAYOUTS are variations of these three typical plans, except that one contractor placed the lock in the drift tunnel between the bottom of the shaft and sewer.

Specifications require duplicate units as a safety measure in case of trouble. This requires at least two low-pressure compressors, though most installations have three or four. One or two high-pressure compressors for air tools and grouting are installed at each shaft.

Shaft equipment

Hoisting equipment varies widely. On contracts 3 and 8 a double-cage hoist is used in connection with a double-drum electric engine. Cars are brought to the surface on these jobs. On contracts 4 and 7, skips are installed, which receive the muck from cars at the bottom, and dump automatically into elevated bins at the surface. Small cage hoists handle material going into the tunnel.

Crawler cranes are used as hoists in open shafts on contracts 5, 9 and the south end of contract 6. Muck-car bodies only are hoisted at these shafts. New specifications for the Southwest intercepting system, just getting under way, require that all shafts be fitted with cage or skip hoists operating in guide frames as a safety precaution.

At the Wacker Drive shaft on contract 6, where the shaft is sunk from the lower level of the two-level street, lack of overhead clearance necessitated the installation of an interesting hoisting arrangement. A gantry crane was installed over the shaft, extending over the adjacent roadway. A depressed ramp cut into the roadway permits the muck-receiving trucks to drop down far enough to clear the gantry. The traveling electric hoist lifts muck-car bodies up the open shaft, then transfers them over a waiting truck. A fixed short chain clamped into the bottom of the box dumps the load as the box is lowered. Fig. 8 shows this rig.

FIG. 8—NOVEL GANTRY at a shaft on the lower level of Wacker Drive made necessary because of lack of overhead clearance. The traveling hoists lift loaded muck-car bodies out of the shaft at the extreme right and transfer them to trucks.

The same pressed-steel plate lining as used in the tunnels has been adopted for shaft lining on many of the contracts. Usually these shafts are 12 to 15 ft. in diameter, and the lining is installed without supporting ribs. On the Calumet conduit a 32-ft. circular shaft was required. Here structural ribs are set between rings of plates and are further stiffened with a system of vertical wales and additional ribs. The shaft on contract 4 is lined with concrete piles built within bored holes.

At the smaller plate-lined shafts a separate shaft also plate-lined and fitted with a spiral stairway, serves as a manway. Two of these installations are shown in Fig. 7, which also shows typical shaft, lock and track layouts.

Ventilation

Some of the headings leak considerable air, so ventilation is no problem. On other headings the air-supply line is carried close to the face to supply fresh air to the workmen. Frequent operation of the locks provides an additional circulation. Occasionally it is necessary to open the blow-off line to change the air in a tunnel. Open fans were installed in one or two headings to circulate the air, but their use was abandoned when it was found that undesirable drafts were created. A portable blower with a canvas duct is used to clear the blasting fumes from the rock heading on contract 3.

Direction

The tunnels are being driven for the Sanitary District of Chicago under the direction of Philip Harrington, chief engineer. A full list of contractors and resident engineers was given at the end of the first article in this series. The name of W. C. Miller, resident engineer, was omitted from the original list.

Rigid-Frame Design in the Bureau of Yards and Docks

By G. A. Hunt
Designing Engineer,
Bureau of Yards and Docks,
Navy Department, Washington, D. C.

FOR SEVERAL YEARS the Bureau of Yards and Docks, Navy Department, has advocated more exact analysis of continuous beams and rigid frames. The method of analysis recommended was developed by Harris Epstein, designing engineer of the Bureau, and presented in the 1929 edition of the Bureau's "Standards of Design for Concrete," by Commander Ben Moreell, C. E. C. Derived from the accepted theory for the analysis of rigid frames, the method gives exact results for frames without sidesway and may be used in certain cases to obtain moments

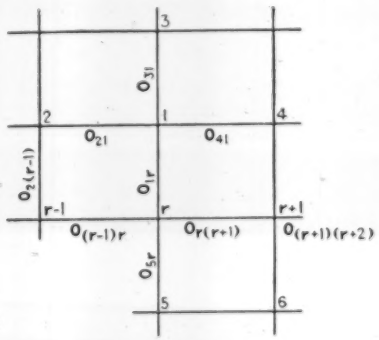


FIG. 1—JOINT AND MEMBER designation in a typical rigid frame.

where sidesway exists. Each load may be conveniently treated separately, enabling ready determination of maximum moments due to combinations of dead and live loads. Each string of the structure with adjacent members is analyzed as a unit—a factor A applied to each member adjacent to the string measuring the restraining effect of other members of the structure.

The moments in a frame depend on the relative stiffnesses of its members and on loading conditions. The treatment on which the following procedure is based develops two sets of coefficients: moment coefficients for unloaded spans (α), dependent on relative stiffnesses; and moment coefficients for loaded spans (C, U), dependent on relative stiffnesses and condition of loading for loaded span. These coefficients are obtained from formulas for which the accompanying nomographs give solutions. These formulas will appear in the forthcoming revised edition of the "Standards of Design for Concrete," and are a rearrangement of formulas derived in the 1929 edition of that publication. The charts presented herewith mechanize the application of the method given therein to frames whose members have constant, but not necessarily equal, moments of inertia.

Procedure

Symbols $r-1$, r, $r+1$, etc., denote successive joints of the beam or column string under consideration; subscript $(r-1)r$ denotes end $r-1$ of member $(r-1)r$, etc. (Fig. 1.)

Step 1—Compute O for each member and J for each end of each member. For example:

$$O_{1r} = \frac{\text{moment of inertia}}{\text{length}} = \frac{I_{1r}}{L_{1r}}$$

$$J_{1r} = A_{1r}O_{1r}, \text{ where } A_{1r}$$

$$= 4\,\frac{3O_{1r} + A_{21}O_{21} + A_{31}O_{31} + A_{41}O_{41}}{4O_{1r} + A_{21}O_{21} + A_{31}O_{31} + A_{41}O_{41}} \quad (1)$$

$$J_{r1} = A_{r1}O_{r1}$$

The factor A varies between 3 and 4 and may be recognized as a modification of the numerical coefficients of the slope-deflection formulas for members free at one end ($M = 3EK\theta$) and members fixed at one end ($M = 4EK\theta$).

Step 2—Compute S and Z for each member. For member $r(r+1)$

$$\overrightarrow{S_{r(r+1)}} = \frac{O_{(r-1)r}}{O_{r(r+1)}},$$

$$\overleftarrow{S_{(r+1)r}} = \frac{O_{(r+1)(r+2)}}{O_{r(r+1)}}$$

$$\overrightarrow{Z_{r(r+1)}} = \frac{J_{1r} + J_{\delta r}}{O_{r(r+1)}}$$

$$\overleftarrow{Z_{(r+1)r}} = \frac{J_{\alpha(r+1)} + J_{\alpha(r+1)}}{O_{r(r+1)}}$$

These values may be obtained for each member with one setting of the slide-rule. $S = 0$ for end spans. $Z = 0$ at joints having no members adjacent to the string. For fixed ends, S may be taken as equal to ∞ and Z equal to 0.

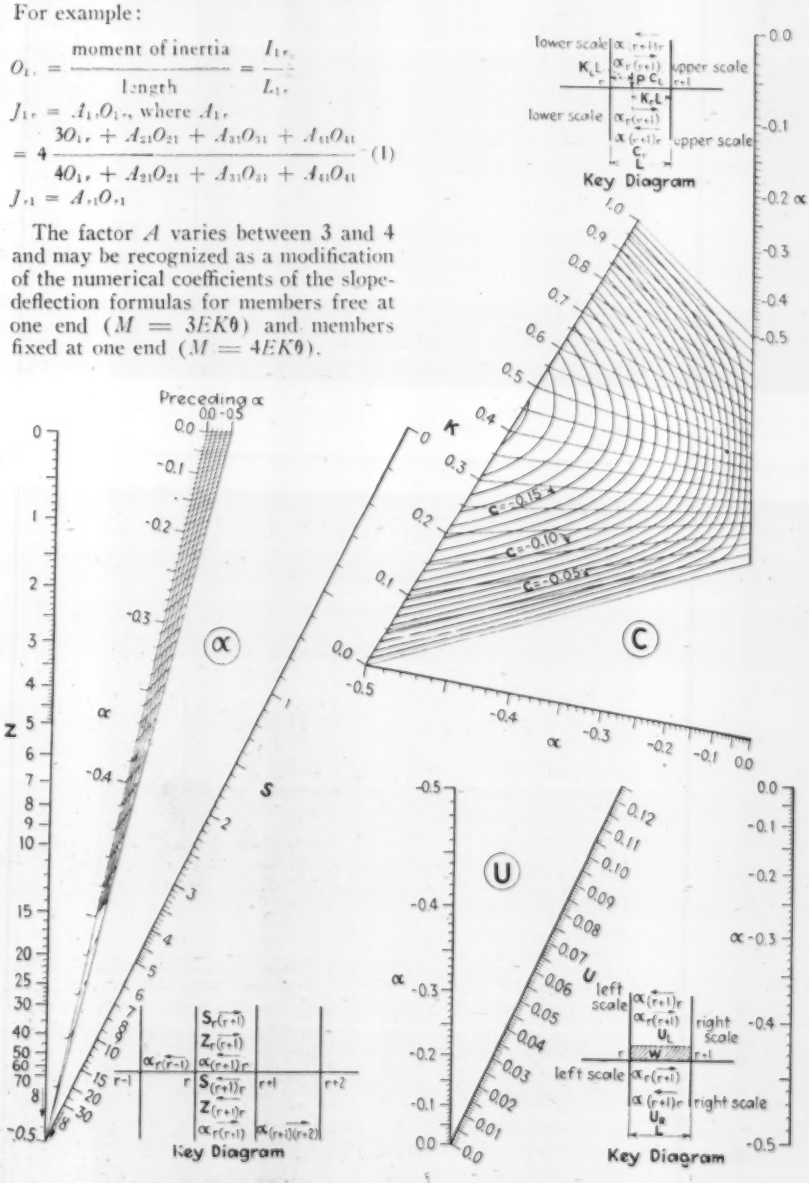


FIG. 2—DESIGN CHARTS for obtaining moment coefficients α for unloaded spans and moment coefficients for loaded spans (C for concentrated loads and U for uniform loads.)

Step 3—Determine α values from α chart (Fig. 2), starting at ends of string. $\alpha = 0$ for free ends. $\alpha = -0.5$ for fixed ends. For end spans the preceding α of the α chart equals 0. It is to be noted that α values for each span are built up successively, from left to right for $\alpha \leftarrow$ and from right to left for $\alpha \rightarrow$. The arrows indicate the direction in which the coefficients are to be applied in obtaining moments. Use $\alpha \leftarrow$ to obtain moments in unloaded spans to left of loaded span, and $\alpha \rightarrow$ to obtain moments in unloaded spans to right of loaded span.

Step 4—Determine C values from C chart (for concentrated loads) and U values from U chart (for uniform load over the whole span).

In using the α, C, and U charts (Fig. 2) draw a line between known values and read off required value on proper scale. The key diagram shown on each chart will be found useful in selecting appropriate tabulated values, related values shown above the line giving coefficients used to obtain moments toward the left, and vice versa for those values that are shown below the line.

Step 5—Compute the end moments in the members. For the loaded span:

$$M_{(r+1)} = C_L PL, \quad M_{(r+1)r} = C_R PL$$
$$M_{(r+1)} = U_L WL, \quad M_{(r+1)r} = U_R WL$$

where R and L denote, respectively, the right and left ends of the loaded span.

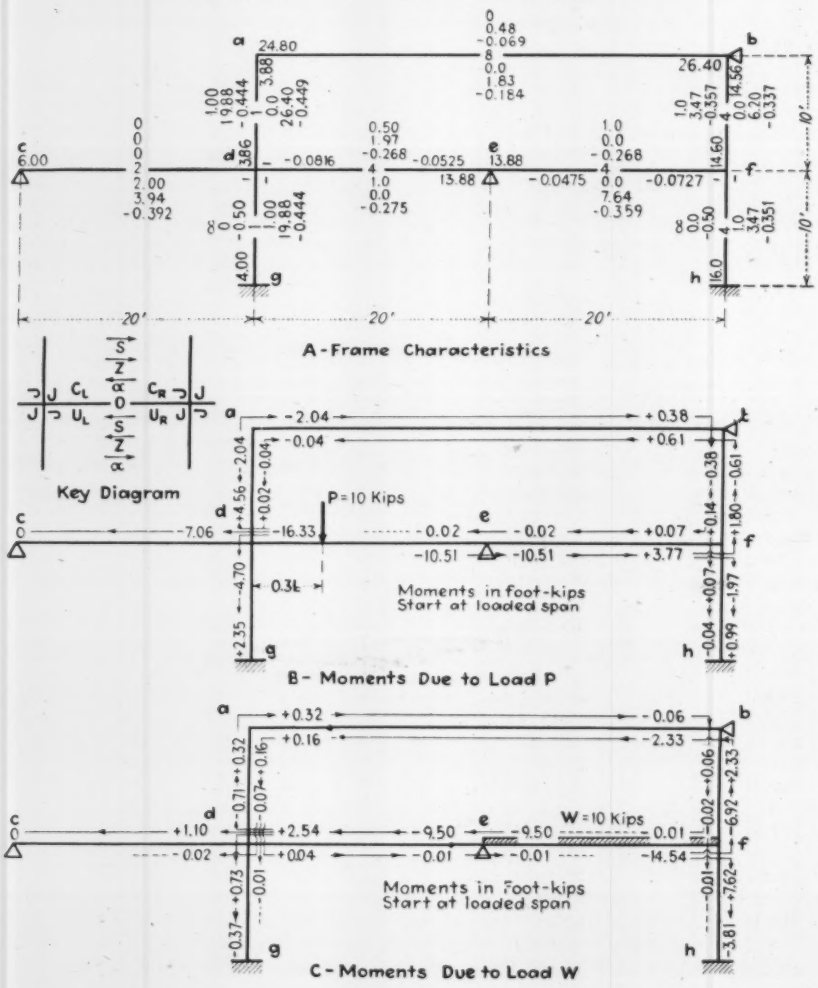
The joint moments obtained above are resisted by the other members at the joint in the ratio:

$$\frac{J \text{ of a resisting member}}{\Sigma J \text{ of all resisting members.}}$$

The J values to be used are those at the opposite ends from the joint under consideration. The moment at the far end of a resisting member is obtained by multiplying the resisting moment obtained above by the proper α value. These operations are repeated for other spans and joints.

Signs—The usual designer's convention is used for signs, negative moment corresponding with tension in the top flange of beams and columns, the latter being considered as looked at from the right-hand side of the sheet. Coefficients C and U are always negative, indicating that the loaded span end moment due to the load on the loaded span is always negative. The coefficient α is always negative, indicating that the moment at one end of an unloaded span is of opposite sign to the moment at the other end.

FIG. 3—TYPICAL RIGID FRAME, illustrating method of moment calculation developed by the Navy Department's Bureau of Yards and Docks.



Example

The frame of Fig. 3 offers most of the conditions met with in the analysis of rigid frames. The frame characteristics obtained in steps 1, 2, 3 and 4 are indicated in A. The moments due to the loads are given in B and C.

In obtaining A values for members adjacent to the string under consideration, the A values for members at the far end of the member adjacent to the string are taken as 3, 3.5, or 4, according as the far end condition of the member is free, intermediate, or fixed. Formula (1) may be refined to any degree of accuracy desired, but as given it provides exact results. Usually A may be estimated directly with satisfactory results. The detailed computations for A values follow:

$$A_{ad} = 4\,\frac{3 + 3.5 \times 8}{3 + 3.5 \times 8} = 3.88$$

$$A_{ef} = 4\,\frac{3 \times 4 + 3.5 \times 4}{4 \times 4 + 3.5 \times 4} = 3.47$$

$$A_{bf} = 4\,\frac{3 \times 4 + 3.5 \times 8}{4 \times 4 + 3.5 \times 8} = 3.64$$

$$A_{ah} = 4\,\frac{3 \times 8 + 3.5 \times 1}{4 \times 8 + 3.5 \times 1} = 3.10$$

$$A_{cc} = 4\,\frac{3 \times 1 + \infty}{4 \times 1 + \infty} = 4.00$$

$$A_{bc} = 4\,\frac{3 \times 8 + 3.5 \times 4}{4 \times 8 + 3.5 \times 4} = 3.30$$

$$A_{hf} = 4.00$$

$$A_{cd} = 4\,\frac{3 \times 2 + 0}{4 \times 2 + 0} = 3.00$$

$$A_{ed} = 4\,\frac{3 \times 4 + 3.5 \times 4}{4 \times 4 + 3.5 \times 4} = 3.47$$

$$A_{dc} = 4\,\frac{3 \times 1 + 3 \times 2 + 4 \times 1 + 3.5 \times 4}{4 \times 1 + 3 \times 2 + 4 \times 1 + 3.5 \times 4} = 3.86$$

$$A_{fb} = 4\,\frac{3 \times 4 + 3.5 \times 4 + 4 \times 4}{4 \times 4 + 3.5 \times 4 + 4 \times 4} = 3.65$$

Conclusion

The example given above is solved in order to illustrate the formal method of procedure. However, the method given herewith has a greater utility than for the solution of such elaborate problems. It affords an everyday tool with which the designer may rapidly determine moment coefficients for varying stiffness

relations and loading conditions. It will be found that, with even slight familiarity with the method, α values may be closely estimated. Then with these estimated values, the C and U charts will give moment coefficients for loaded spans. For instance, for interior spans of continuous beams of uniform moment of inertia and length the α chart shows that $\alpha = -0.268$. With this value we may directly obtain loaded span coefficients from the C or U chart. If the continuous beams are supported on columns, the value of α increases, becoming larger as the stiffnesses of the supporting columns increase. Another special use is for single members fixed at one end and free at the other, or fixed at both ends. Here $\alpha = -0.5$ for fixed end and $\alpha = 0$ for free end. The C chart may also be used to obtain influence lines. Drawing a straight line on this chart between the determined values of α, the ordinates at the tenth points of the influence line for moment at a support are read at the tenth values of k. With this influence line determined, influence lines for any other function may be constructed.

It has been the writer's experience that the analysis of rigid frames is a slow process more because of arithmetical errors than because of difficulty in grasping the theory. It is with this in mind that the procedure described herein has been developed.

AN ENGINEER'S RECOLLECTIONS

By JOHN F. STEVENS

Consulting Engineer, Baltimore, Md.

·VIII·

The Railway Invasion of Central Oregon

A railway charter of questionable legality purchased by Hill lines to get a foothold in Oregon—Construction pushed despite strong opposition while legal fight over charter is carried forward successfully

IN REVIEWING some of the high spots of his long contact with Jas. J. Hill, Mr. Stevens, in the issue of June 13, p. 850, referred briefly to Mr. Hill's forcing an entry for his railway lines into central Oregon. In the following article Mr. Stevens tells the details of his part in that undertaking. This article is the concluding one of the series of recollections dealing with Mr. Stevens' railroad work. Some comment growing out of his work on the Panama Canal is to be published in the near future. —EDITOR.

IN THE YEAR 1909, railway transportation in Oregon was almost wholly a monopoly of the so-called Harriman Lines. As a fervid orator outlined the situation at a banquet: "Oregon is bounded on the north by the Oregon Railway and Navigation Company, on the east by the Oregon Short Line, on the south by the Union Pacific, and on the west by the Pacific Ocean. Thus, Mr. Hill, you can see that we are between the devil and the deep blue sea."

The Northern Pacific and Great Northern reached Portland over the former's line from Seattle. Both roads also reached Portland over a joint line recently constructed by them from Spokane and Astoria over a purchased line. Other than a short electric line from Portland into the Willamette Valley, the Harriman lines had no railway competition whatever in the state.

In that year Jas. J. Hill called me to a conference with him in New York, in which he expressed his firm determination to extend the so-called Hill lines, the Northern Pacific and the Great Northern into, and south through, Central Oregon, and asked me if it could be done and if I would undertake to do it. I said that it could be done, and I would do it, although at that time neither he nor I knew just how it could be accomplished. But I felt that I could find a way.

A route into central Oregon

Provided with ample funds, I went at once to Portland. I was entertaining some preconceived ideas as far as possibilities went, and to veryify them, I made a hasty auto trip, *sub rosa*, through certain parts of the state. It convinced me that, topographically, my ideas were well founded. The Deschutes River, rising far south, flows almost directly north, and into the Columbia River about 100 miles east of Portland. Its valley offers the only route for a reasonably low grade line of railway into central Oregon from the north, east of the Cascade Mountains. I knew that I must occupy this valley or fail in my undertaking.

Still working under cover, except with our attorneys, Carey & Kerr, I discovered that there was a charter (of doubtful legality) in existence for a railway, the Oregon Trunk, up this valley and on south to the Oregon-California line. Some little grading had been done in the lower valley, but the parties holding the charter had neither the funds nor the experience to enable them to build the line. I was told that efforts had been made to sell the charter to the Harriman interests, which offer was declined, they probably feeling sufficiently intrenched without it and fearing no competitor. After discussions with the attorneys, and being thoroughly informed as to the pros and cons, I determined to get possession of the charter.

Charter purchased at night

I knew that immediately my plans were revealed, I would have all the fight on my hands that I wanted, without the owners of the paper road getting into the contest. To apply for a new charter meant publicity, with delay and probable defeat. So the purchase of the stock of the moribund road was arranged, and I met its representative about midnight in the rain under a tree in a public park in Portland and verbally closed its transfer, passing a large-sized check the next day, not to be cashed for several days.

Then I had engineers quietly set a few stakes along the old line in the lower valley. There was a trustworthy firm of contractors who had formerly done a large amount of railway construction under me and who had plenty of equipment near Portland. Moving in without banners or brass bands, the first intimation that the Harriman people got was that of dirt flying on the construction of a railroad up the Deschutes Valley. Then the fur began to fly.

Knowing the value of public sentiment and knowing equally well how it

would line up. I then cast off all secrecy and announced through the press just what I was going to do and whom I represented. That announcement provided the Northwest with a live topic for some months.

The Harriman people had already located a line of railway south from their O.R.&N. Ry., occupying in part the lower reaches of the valley and conflicting in places with the line I had bought; and of course from the contiguity of their main line they could quickly throw a heavy construction force into the debatable zone, which could effectually block me if rightly handled. As soon as they awoke to the fact that something was doing, they rushed a small force in and began a battle to oust our contractors; in this effort they did not succeed. It was quite exciting for a few days, and some serious fights took place, but I do not recall that any fatalities resulted from the scraps.

The whole affair was greatly magnified as usual by the press and caused wide excitement. Failing to dislodge our men from the canyon, the other parties withdrew their forces, and we then prepared to go to the mat with them in the courts.

Rival lines in a race

They located a line on the opposite side of the canyon from us and began construction without interfering with our line or work. They continued this work for a hundred miles until they reached Madras, a small town on the plateau east of the river, which town was an objective point for us, but our rails beat them there. More anon about this feature of this situation.

The charter validated

The charter that I had acquired was of doubtful value for two reasons: it did not specify its proposed southern terminus, as required by the law of Oregon. Also it was questionable if its former owners had, in point of time, done sufficient work to validate it as a legal entity. In buying it, I was, in fact, gambling upon a shoestring, which I felt might break at any time with no alternative in sight. I was not especially happy over the situation for a couple of months.

For good reasons our attorneys took the case from the state to the federal court, as, being a Nevada corporation, we had a right to do. Carey & Kerr, our attorneys, handled the case in a masterly manner and won unreservedly, to my great relief. They at once took out an Oregon charter, and we all breathed easier.

Construction pushed toward Bend

Meanwhile I was pushing the location stakes up the valley as fast as a heavy force of engineers could place them. I also let a contract at fair unit prices to the same contractors for 150 miles of construction which would take the line to the town of Bend, where there were heavy lumber interests. We met with more attempted obstruction from the Harriman people when we sought right-of-way across the Warm Springs Indian Reservation, midway up the valley, but the Indian Department at Washington granted our application. Thus the way was effectively cleared over the entire line.

Cooperation refused

Before our legal position had been established by the court, I sought and obtained a conference in Chicago with the late Julius Krutschnitt, Mr. Harriman's leading official in charge of such matters. I made him a proposition that we should quit fighting and build a joint line, as a single line could handle all the traffic easily for an indefinite number of years to come. But I got no encouragement; quite the contrary. I was rather gruffly told that I could build no railroad up the Deschutes; that the only way I could get up that valley would be to walk. That I was nothing but a penniless promoter and had no such backing as I boasted. I replied: "Possibly so, Mr. Krutschnitt, I may be defeated, but if I am, you all will know that you have been in one hell of a fight." There was no room for further attempts at diplomacy. Mr. Krutschnitt's refusal to cooperate with me was a grave mistake which cost the two companies millions of dollars, all wasted.

Joint line now used

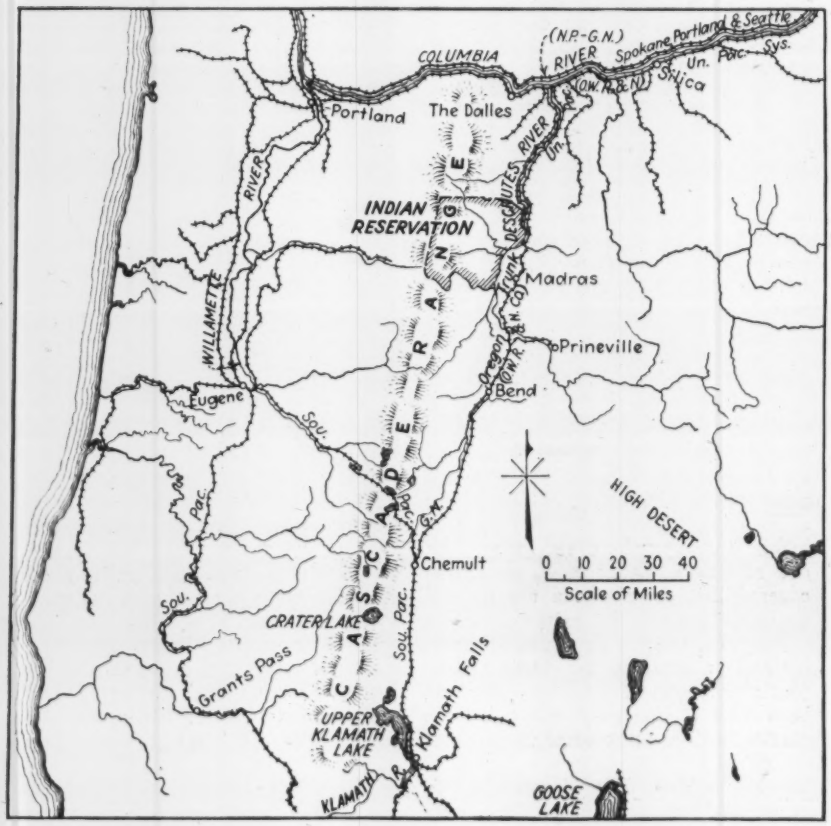
Some years after both lines were completed, a joint line, made up of different sections here and there of the two lines, was established by the rival companies, and is now, and for years has been operated by both from the Columbia River 151 miles to the city of Bend in central Oregon. The scattered portions of the lines not used remain as a monument to overweening confidence.

One reason why our opponents thought that they had us bottled up in our efforts to get into the Deschutes Valley was from the fact that our main line was on the north side of the Columbia River, requiring a steel bridge nearly a mile long to cross, which would require many months to construct. But I circumvented this difficulty by buying a steamboat on the upper Columbia, bringing it down to near the site of the proposed bridge and turning it into a transfer boat, which successfully transferred all our track and other materials, taking locomotives and cars over easily.

From Bend to Klamath Falls

Our engineers completed the location surveys south to the city of Klamath Falls, near the California line, and I let a contract to build the section from

THE HILL LINES entered central Oregon by way of the Deschutes River Valley, buying the charter of a small railway that had been unable to finance construction.



Bend to that city. After some little work had been done on it, Mr. Hill decided to stop awhile at Bend; so that part of the construction was closed up, and the track stopped at the latter city.

The Klamath Falls line

It was years afterward, I think in 1925, that the Great Northern determined to extend the line to Klamath Falls. Meanwhile the Southern Pacific had built a new line from Eugene, in the Willamette Valley, southeasterly across the Cascade Mountains and then to Klamath Falls, much of the latter part of its new line using practically the same location that the Oregon Trunk had made years before. The Northern Pacific then decided that it would go no farther, and the Great Northern took over the former's interest in the line south of Bend and went ahead alone.

When the Great Northern applied to the Interstate Commerce Commission for a "certificate of convenience," to enable it to construct its proposed extension, the Southern Pacific fought it vigorously, and after a long delay a compromise was reached which was approved by the I.C.C. Under the compromise the Great Northern acquired an equal joint interest in the Southern Pacific's line from Chemult to Klamath Falls. Then, having received its certificate of convenience, it extended its line to Chemult and so finally reached Klamath Falls. It, and the Southern also jointly, took over a road leading from Klamath Falls easterly to a heavy lumber district.

California extension project

From the time when I first went to Oregon to try to get a railroad entrance into central and southern Oregon, the idea of eventually pushing through into California grew stronger and more insistent in my mind. Quietly, and unknown to anyone but myself, Ralph Budd, who later became our chief engineer, spent much time in scouring the country between Klamath Falls and the Western Pacific Ry., and the substance of his report was that a practical line could be gotten across the country without excessive cost of construction. Not until I had Mr. Budd's report did I disclose to Mr. Hill what I had done. He was very noncommittal in regard to the matter.

I said that I was going to put a couple of engineering parties at work down there. I did not intend to do so at that time, I only wanted to draw him out, but my crafty design did not meet with much success. He neither approved nor disapproved, merely saying that he thought that the Western Pacific would be glad to get such a connection, as it needed more business. If he had "cherished such a dream for years," as the newspapers repeatedly reported after the project was consummated, he did not so express himself to me. That did not necessarily follow, but if he had such a dream at that time, then there were two of us.

In 1928 the Great Northern decided to extend its line into California. Arrangements were made with the Western Pacific for the building of the line by the two companies, the Great Northern to build 88 miles to the Pit River Valley, and the Western Pacific to build 112 miles to connect with it. When application was made to the I.C.C. for a certificate of convenience, the Southern Pacific renewed the old fight more bitterly than ever, but the certificate was granted and the lines were built, connecting with the main line of the Western Pacific at Keddie, a station in Feather River Canyon. Thus the Great Northern had cleared the way for a connection with San Francisco and intervening cities, and with the Santa Fe system at Stockton.

Construction was vigorously pushed, and the rails of the two roads were joined, and the last spike was driven with simple ceremonies, at which I was present, on Nov. 10, 1931. So finally there became a reality that may have been a dream of more than one, but I can speak only for myself. It signalized the completion of a project in which I had faith, and which I had hoped for through long years.

The Hill lines having acquired the Oregon Electric Ry. and a Terminal Ry. in Portland, I extended the former line to the city of Eugene in the Willamette Valley, and the latter to a point about 50 miles west of Portland, where there is a very large stand of fine timber. Both these branch lines, especially the latter, have proved valuable feeders to the Northern main lines.

During the two years that I spent with the Hill lines in Oregon, I had constantly and secretly in hand some possible moves in the railway game, which, while not especially closely allied to the building of the Oregon Trunk main line, seemed necessary to provide data for future use.

All of the millions of dollars that were spent in building the Oregon Trunk, extending the Oregon Electric and Terminal roads, were passed through my personal account, and no accounting was made until I had completed the work.

I think that as many situations requiring what may charitably be called "finesse" arose during those two years as ever falls to the lot of an engineer.

Letters to the Editor

An Interesting Old Bridge

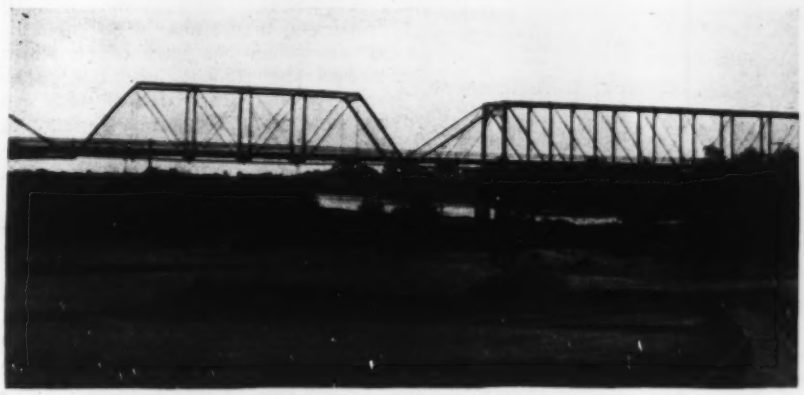
[Last week's floods in the Colorado River are reported to have destroyed this ancient structure.—EDITOR.]

Sir—The accompanying photograph shows a portion of a bridge near Austin, Texas, which has been rather interesting to me because of its design and age. It is known locally as the Montopolis Bridge and spans the Colorado River about 3 miles below the city. There are three cantilever trusses and two suspended spans. The suspended spans have six panels each; there are two cantilever panels for each truss, and the anchor spans are of ten panels.

Probably the most interesting feature of this bridge is the name plate which bears the following inscription: "1888, Built By King Bridge Company, Cleveland, Ohio."

FRANK W. CHAPPELL,
Consulting Engineer.

Dallas, Texas,
May 17, 1935.



SUSPENDED SPAN with cantilever and anchor span of an old Colorado River bridge near Austin, Texas.

Designing Concrete Members for Bending and Compression

Sir—In your issue of April 18, 1935, p. 566, an article for calculating the stresses in a reinforced member subjected to bending and compression ap-

peared, which analysis will give correct results; but the author arrived at the correct results by actually making three approximations, which seems more than necessary. In his first assumption the author uses $f_c = 800$ lb. per sq.in. and $f_s = 18{,}000$ lb. per sq.in. and states that these values are too high. Just how the author knew that these stresses are too high is not clear to the writer. The author also assumes a value of $k = 0.4$, making $kd = 8$ in. and $jd = 17.33$ in., which is approximately correct; these values can be used as a basis for solving the first values of f_c and f_s which were assumed.

Taking center of moments about a point 17.33 in. from the tension steel, we have $f_s = \frac{T}{A_s} =$

$$\frac{(30 - 17.33) \times 25{,}000}{17.33 \times 1.5} = 12{,}180 \text{ lb. per sq.in.}$$

Equivalent area of concrete in compression $= \frac{1}{2} \times 0.4 \times 10 \times 20 = 40$ sq.in.

Equivalent area of steel in

$$\text{compression} = \frac{6}{8} \times 15 \times 1 = 11.25 \text{ sq.in.,}$$

making the equivalent total area in compression = 51.25 sq.in. acted upon by a stress of f_c.

On account of the steel in compression, the width b of the member will be equivalent to $\frac{51.25}{40} b = 1.28125b$.

Using the well-known equation $R = \frac{N c_1}{b d^2}$ we have here $R =$

$$\frac{25{,}000 \times 30}{1.28125 \times 10 \times 20 \times 20} = 146.3;$$

and referring to a diagram in a standard textbook ("Structural Members and Connections," by Hool & Kinne, p. 467) with $f_s = 12{,}180$ and $R = 146.3$, we obtain $f_c = 733$ lb. per sq.in. and $k = 0.474$, making $kd = 9.48$ in. and $jd = 16.84$ in.

Using the above values, which are not a great amount in error, we have then, using the author's reasoning, $f_s' = 733 \times 15 \times \frac{7.48}{9.48} = 8{,}680$ lb. per sq.in.

C = compression in concrete $= 733 \times \frac{1}{2} \times 10 \times 9.48$	= 34,740
C' = compression in steel $= 8{,}680 \times 1^*$	= 8,680
Total compression	= 43,420
Moment of C about tension steel $= 34{,}740 \times 16.84$	= 585,000
Moment of C' about tension steel $= 8{,}680 \times 18$	= 156,200
Total moment	= 741,200

$N = \frac{741{,}200}{30} = 24{,}700$ lb., $T = 43{,}420 - 24{,}700 = 18{,}720$ lb., and $f_s = \frac{18{,}720}{1.5} = 12{,}480$ lb. per sq.in. As f_s does not differ very much from the assumed value, there is no need of any additional approximations.

The stresses for $N = 25{,}000$ lb. are as follows:

$$f_c = \frac{733 \times 25{,}000}{24{,}700} = 742 \text{ lb. per sq.in.}$$

$$f_s = \frac{12{,}480 \times 25{,}000}{24{,}700} =$$

12,630 lb. per sq.in.

It is seen that these values differ only a very small amount from those given by the author, but the method eliminates two approximations, which means considerable saving of time.

All calculations have been made with a 20-in. slide rule.

A. W. FISCHER
Pennsylvania Sugar Co.

Philadelphia, Pa.,
April 26, 1935.

*This value should have been $\frac{n-1}{n}$ of what the author used, but for comparison the same value is used.

Pay for Engineers

Sir—Advertisements which appeared in a local paper make one wonder if selecting engineering for a profession isn't a mistake. One offers $18 for a washer and greaser in a garage and $24 for a bartender. Another inquires for "draftsmen structural and mechanical; university graduates, over 10 years' experience. Must be quick and accurate. Salary 40c. per hour. N.R.A. hours."

If the various engineering societies would stop dreaming and spend more time pondering on the material things of life rather than the ethical, one would in time perhaps be able to command a salary equal to that of a bartender or grease washer.

Ethics and our debt to mankind and to the advancement of civilization sound good until they are told to the butcher and baker. Really after all, the main reason for working is to acquire money with which to provide one's family with the necessities of life.

A great deal has been written about broadening the training of the engineer, but no college has yet a course which teaches the student how best, after spending four years of hard study and ten more years to acquire experience, to bring up a family on $16 a week.

R. BEGHTOL.

Chicago, Ill.,
May 27, 1935.

Safety Markers on Poles

Sir—Referring to p. 257 of your issue of Record of Feb. 14, 1935, "Safety Markers on Poles Indicate Road Margins," the idea is very similar to one I have had for some time.

Form metal laths of either thin sheet aluminum or other metal into channels ¼x2 in. (approx.). Assemble in the shop enough of these channels to cover about ½ the circumference of the pole when arranged vertically and spaced 2 to 3 in. apart (similar to wood laths) by securing them to two galvanized-iron wires—one near the top and one near the bottom end. If iron channels are used, a simple way to secure them to the wire would be to press-weld the wires into the edge of the channels. An alternative method of securing consists of punching a hook out of the channel to be clamped down on the wires.

The assembly of channels, if made of metal other than aluminum, could be painted by spraying with aluminum.

Form eyelets for nailing in the end of each of the assembly wires.

The assembly is now ready to be taken out and secured to the poles by four nails in the eyelets previously placed in the ends of the wires.

I believe the saving in labor and handling of fewer parts out on the job would justify forming and assembling work in a shop, if the latter is done on a quantity basis.

H. W. BOWLY.

New York, N. Y.,
March 21, 1935.

Sponsorship of Atlanta Sewage Tests

Sir—In your issue of May 30, 1935, p. 792, you ran a news item entitled "Atlanta Making Experiments on Sewage Treatment," in which you tie my name and that of Mr. Killam, my associate, to the tests conducted on the Lewis process.

Your statement is only partly true, and like most half-truths it is very unfortunate. It is true that this office agreed to conduct tests of the Lewis process but refused to confine the experimental work done in Atlanta to the Lewis process alone.

At the conclusion of the tests conducted according to the Lewis formula, we conducted a wide range of tests on a great many combinations of chemicals, sludge treatment, with and without chlorination, and with and without final filtration.

Since conducting these tests, because of the truth of the statement that our first work in Atlanta was an examination of the value of the Lewis process as such, we have been dubbed "Lewis Process Engineers."

While it is quite true that the tests on the Lewis process were financed by E. D. Gregory, representing the promoters of the Lewis process, it is not true that the subsequent and more valuable and enlightening tests were financed by him or by anybody connected with Dr. C. H. Lewis.

ALEXANDER POTTER.
Consulting Engineer.

New York City,
June 19, 1935.

Book Reviews and Notes

A Monthly Commentary on Current Additions to the Civil Engineer's Library

Highway Principles Restated

PRINCIPLES OF HIGHWAY ENGINEERING—Second Edition: By Carroll Carson Wiley. Cloth; 6x9 in.; pp. 542. Photographs, tables, diagrams. Published by McGraw-Hill Book Co., New York and London. $4.

Appraisal of the first edition of Professor Wiley's work as one of the best of the textbooks for students in highway engineering is verified by examination of the second and revised edition. In organization of the text and arrangement of subjects no considerable change has been made, but all parts have been modernized to include information that has developed in the seven years since the first text was printed. Like the first, the present text is a presentation of principles and practices rather than a compendium of factual examples. By this treatment it has a distinct appeal to the engineer in practice as a source from which he can refresh his memory of fundamentals. For the student, application of the principles in actual practice is exemplified by presenting well-selected problems for solution.

A German Treatise on Hydrology

HYDROGRAPHIE—By Friedrich Schaffernak. Paper; 7x10 in.; pp. 438; diagrams and tables. Published by Julius Springer, Vienna. RM 46.50.

Reviewed by I. Gutmann,
Associate Editor, Engineering Index, New York

AS A MATTER of common usage and for no particularly weighty reason the average American engineer would designate the subject of Dr. Schaffernak's book as hydrology. Indeed, as to scope its nearest equivalent in American literature is Adolph Meyer's Hydrology. Yet, Dr. Schaffernak's "Hydrographie" differs greatly from Adolph Meyer's and also from Daniel Mead's texts on hydrology in the treatment of its subject matter, for it does not dwell so much on the nature and specific manifestations of the phenomena as on their measurement and quantitative aspect. Its first part, representing nearly one-half of its volume, treats of the methods and apparatus used in the measurement of rainfall, streamflow, underground water supply, silt load and ice load, temperature, humidity and wind. The second part, accounting for about one-eighth of its pages, deals with statistical methods, both analytical and graphical, such as correlation, curve fitting, construction of periodograms, frequency curves, diagrams and alignment charts. The third part, which is practically the balance of the volume, details the use of hydrological data in the study of runoff, lake and river hydraulics, floodflows, useful yield of watersheds, water-power resources, forecasting of river stages, storage and regulation of stream regimens.

This cursory inventory reveals the richness of the book and the originality of its plan. The part on statistical methods is an especially novel and desirable addition to tests of this kind. Rainfall measurement and stream gaging are discussed in great detail, and many devices not known, or hardly known, in America are described.

With all this the book is rather provincial in its general character as it summarizes, with some exceptions of course, only the practice and experience recorded in the German language, which is largely the practice and experience of German, Austrian and Swiss engineers and of some Russians who occasionally write in German. Many of the ways and means of engineers of other countries are treated but lightly. The results of indispensable American research on evaporation from water surfaces are ignored along with other highly important subjects whose knowledge is not merely optional.

Miscellaneous Notes on Booklets and Reprints

A RECONNAISSANCE REPORT on proposed reservoir sites in the basin of the Big Muddy River in southern Illinois, prepared for the Illinois Emergency Relief Commission by the University of Illinois in cooperation with the state's geological, water and natural history surveys, has been published by the University, Urbana, Ill., in mimeographed form.

TRAFFIC CONTROL and highway safety practices are usefully discussed in a dozen papers and half as many committee reports just published as the *Proceedings* of the annual meeting for 1934, of the Institute of Traffic Engineers (175 Fifth Ave., New York—$2.50). A number of the papers give records of surveys of accident occurrence and traffic habits that have not been published elsewhere. The volume has definite interest to traffic engineers.

THE FIRST ISSUE of the *Planners Journal*, dated May-June, as the official organ of the American City Planning Institute (Cambridge, Mass.) is a 20-page 8½x11-in. planograph production devoted to high-quality technical planning articles of particular interest to professional planners, reviews and lists of publications and news of Institute affairs. Howard K. Menhinick is the editor, and Henry V. Hubbard is consulting editor. This magazine is primarily for the professional planner. Administrative planning officials have the publications of the American Society of Planning Officials, and citizens have *Planning and Civic Comment*, the successor to *City Planning, Civic Comment* and *State Recreation*, which is the official organ of the American Civic Association, the National Conference on City Planning and National Conference on State Parks.

"SALARIED PROFESSORS IN SCHOOLS OF ENGINEERING, MEDICINE, LAW AND ARCHITECTURE," is the subject of a paper published in the "Review of Legal Education in the United States and Canada for the Year 1934" under the auspices of the Carnegie Foundation for the Advancement of Teaching, 522 Fifth Ave., New York, N. Y.

New Books and Revised Editions

[*Those desiring copies of the books listed below or mentioned elsewhere in this section should order them from the publishers or from their local booksellers.*]

ANUARIO DOS SERVICOS HIDRAULICOS — 1933. Republica Portuguesa, Ministerio das Obras Publicas e Comunicacoes. Paper; 7x10 in.; pp. 406. Portuguese Republic, Lisbon, Portugal.

BUILDING LINES AND RESERVATIONS FOR FUTURE STREETS—Harvard City Planning Studies—Part VIII—By Russell Van Nest Black. Cloth; 7x10 in.; pp. 243. Published by Harvard University Press, Cambridge, Mass. $3.50.

CONTRACTS IN ENGINEERING—Third edition. By James Irwin Tucker. Cloth; 6x9 in.; pp. 341. Published by McGraw-Hill Book Co., New York and London. $4.

DEPARTMENT OF HEALTH, STATE OF NEW JERSEY, FIFTY-SEVENTH ANNUAL REPORT—Cloth; 6x9 in.; pp. 461. Tables and charts of statistical data.

ELEMENTS OF STRENGTH OF MATERIALS—By S. Timoshenko and Gleason H. MacCullough. Cloth; 6x9 in.; pp. 350. Line drawings and tables. Published by D. Van Nostrand Co., Inc., New York City. $3.25.

MODERNIZING BUILDINGS FOR PROFIT—by Kenneth Kingsley Stowell. Cloth; 9x12 in.; pp. 231. Photographs and line drawings. Published by Prentice-Hall, Inc., New York, N. Y. $6.50.

RAILROAD MERGERS—By John Will Chapman. Cloth; 6x9 in.; pp. 157. Map showing 21 systems. Published by Simmons-Boardman Publishing Co., New York City. $3.

REHOUSING URBAN AMERICA — By Henry Wright. Cloth; 9x12 in.; pp. 173. Halftones, line drawings and tables. Published by Columbia University Press, New York City. $7.50.

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June 27, 1935

Slow Progress

LITTLE MORE THAN A WEEK AGO the President authoritatively confirmed the belief that the $1,100 cost-labor ratio would be rigidly applied in carrying out the relief-works program, even though this would convert the program into an undiluted CWA undertaking. Later developments hold out somewhat better promise, though the situation is still badly confused. An official statement that grade-crossing improvement will not be bound by the $1,100 rule, nor by the $1,400 rule fixed for highway construction, revives hope that not all of the four billions will be wasted in activities that can produce no lasting betterments, and that a fair amount of employment beyond the immediate site of the work may be expected. There is a chance also that liberalized procedure may yet be adopted for the highway part of the program, as by planning the entire road budget of a state rather than each individual project for the $1,400 cost limit. Under such practice the low per-capita cost of maintenance operations would balance a substantial amount of permanent construction and permit of useful extension of our transportation network. On the other hand, the application of low-cost limits threatens the completion of important current work, such as reclamation projects already begun; that these projects will create large volumes of employment is not questioned, but the charge is that they do not produce enough employment at the direct site of the work. In short, the refusal to consider indirect labor in selecting projects still endangers the entire program, and, in the opinion of many well-informed observers, threatens its early breakdown unless more realistic and constructive policies are soon put in force. There are signs that some progress is being made toward sounder policy, but at best the progress is exceedingly slow. Job-making is still in the future.

Surveys Deserve Consideration

IF THE HOPE of transforming the works program from a CWA campaign to a practical undertaking is realized, and projects are selected with regard for their permanently useful results, continuance of the national survey work deserves careful consideration. It is reported that the survey projects of the Geological and Coast Surveys have been rejected, on the ground that they exceed the prescribed arithmetical cost limit per man-year of direct labor. If so, it would seem that the value of the proposed work in providing employment for non-manual workers was disregarded. Congress in writing the relief-works act took care to provide for this class of the unemployed by allocating a specific sum for non-manual or white-collar projects. The proposed survey and mapping work has a strong claim to be considered in the light of this provision. But, quite aside from this fact, few white-collar projects have larger possibilities in the way of permanently useful results. The fundamental bearing of correct survey data on future construction, whether public or private, is well known. An important contribution to the completion of our fragmentary national survey and map was made by the unemployment-relief activities of the past two years, but even more valuable results might be attained under the new works program.

Put Off Until 1936

THE LONG-EXPECTED MESSAGE from the President on the nation's transportation system was not the momentous document that was predicted earlier in the year. The President, recognizing that the time for Congress to close up its work and adjourn is drawing near, confined himself simply to endorsement of transport legislation now before Congress and to a specific recommendation that the provisions for railroad reorganizations in the federal bankruptcy act be amended to facilitate such reorganizations, leaving the broader questions involved in unifying the transportation system of the country to a future time. However, he called upon Congress to be prepared at the next session to take up the transportation question as a single problem. To that end he urged that the office of Coordinator of Transportation be continued for at least a year more. This plan is a logical one. The coordinator's studies have not been completed, hence Congress has not the full benefit of the result of his studies; nor have the railroads had an opportunity to consider his recommendations, the most recent of which were made public on June 7 at the time the President sent his message to Congress. As many of the recommendations are for radical departures from accepted practice, the railroads should have an opportunity to give them full consideration before they are called upon to express to Congress their views as to their applicability to current problems. With an early start next year it should be possible to make real progress in modernizing existing legislation affecting the transportation system of the country.

Two New Laws

PRESENTING NEW PROBLEMS to industry of every kind, as well as to employers and workers individually, the passage of the Wagner labor disputes bill and of the social security bill by Congress (subject only to the minor delay of conference agreement) places special perplexities before construction. The perplexity is not diminished by the probability that at least one of the measures will outstand the test of constitutionality in the courts. The Wagner bill so clearly seeks to override past judicial findings that labor relations in manufacture or construction are not subject to federal regulation under the interstate commerce laws, and in addition is so grossly inequitable that it will probably not engage much judicial sympathy. Nor can it count on popular support in view of its gross unfairness and distortion of fact in attributing all "unfair" labor practices to employers and, by implication, condoning all unfair practices tnd racketeering on the part of labor organizers and organizations. Yet, until the act is declared invalid it must be reckoned with. And even more certainly, the probable results of the Security Act will have to be computed and taken account of in planning construction operations. Another requirement puts difficulties in the way of contracting—namely, the requirement that bidders on government contracts must agree to comply with any requirements as to wages, hours, etc., that may subsequently be em-

bodied under the Walsh bill. It is some comfort, though slight, that semi-official statements promise that requirements later to be imposed will not differ materially from those of the NRA codes, and that conflicts with other statutes bearing on labor conditions will be reconciled. For the moment, thus, a new confusion of conditions is created that seems to put a premium on shrewd guessing on the part of contractors.

Roads and Art

FORTY YEARS AGO, as engineers who care to think that far back may recall, the contemporary beautifiers were busy criticizing "iron" bridges. Contrasting them with the graceful arches and mellow tints of masonry construction, they said almost everything that could be said about the crass practicality, sordid materialism and uneducated taste of iron-bridge builders.

The point of this reminiscing, of course, is that now this criticism has for the most part ceased. Views changed partly because iron bridges in time were better designed, partly because the stodgy notions of the old-time beautifiers were forgotten, partly because more people understood the esthetic value that lies in fitness to purpose. This is now established as a very fundamental precept of art.

Modern successors of the one-time beautifiers have now set upon our public roads. No doubt many of these are deserving of attack, but we balk at accepting the artistic substitutes that the attackers would impose. Let us take a specific example. Just now a wholly remarkable superhighway, known as the Merritt Highway, is being built in western Connecticut. It is being built because the present main-traffic route, the old Boston Post Road, from New York to Boston is so overcrowded that speeds are slow and the accident hazard is great. A relief road was necessary, and it was planned to point more directly to its destinations, to separate travel in opposite directions, to provide wider traffic lanes, to provide grade-separations, to reduce access roads, and to safeguard those that could not be avoided. And the finish is attractive both of roadway and roadside. Fitness to purpose would seem to be particularly a property of this road, but the artists are critical. To quote one of them: The road crosses hills when it should wind in around them, and when it crosses hills it cuts through them instead of climbing to the top and developing a view—there was more said but it may be passed. Briefly, the road is inartistic because its designers did not make it a park drive instead of an artery of transportation.

As was the case with the iron bridge, the commercial road is held inartistic because it is not something else, when to make it the other thing would give it the supreme ugliness of being unfitted to its purpose. There is a logical place for the scenic highway, and our National Park Service and memorial associations are building many fine examples. But the excellent purposes sought here are not the purposes of the commercial highway, and the same methods of artistic rendering do not apply in both cases. Only the fundamental art precept of fitness to purpose is universal.

It may be conceded that much more can be done than has been done to relieve our highways from unsightly design and construction. But the fact is that in general road engineers are making an earnest effort to bring improvement about. In general also they have wisely perceived that primarily their objective is to serve transportation, and that to sacrifice directness, speed and safety of travel is not to serve art. If our road designers need the services of men trained in architectural and landscape art to assist in developing our commercial highways, these men should never forget that they are developing tools of transportation.

Construction's First Need

NO SINGLE ITEM of the work for stabilization of the construction industry under the NRA code system was more fundamental and important than the effort to create better labor relations through the work of the Construction Planning and Adjustment Board. The shortcomings of construction, however they may be analyzed, sooner or later trace back to labor relations as the industry's central problem, and therefore the first serious attack on this problem is of outstanding significance. If nothing else is salvaged from the wreck of the NRA, at least the work for the improvement of labor conditions begun by that board should be salvaged by continuing the cooperative study which it began.

For years past the worst troubles of construction have been those arising from labor disputes that had their root in progressive specialization and splitting up of crafts. Costly and disruptive jurisdictional disputes and other conflicts between labor groups arising from this source discouraged the undertaking of construction by increasing its cost. The bad labor conditions that developed reacted on the welfare of the worker quite as seriously as on the prosperity of the construction industry as a whole.

Short-period employment was one consequence of the union-made overspecialization of modern days. It in turn led to low and uncertain income for the worker and discouraged employment on a steady basis. The skilled body of construction labor of earlier days deteriorated, or at least failed to improve with the advancing demands of the art. Costs of production, which in all other fields went down in pace with improving technique, failed to go down in the construction field. Potential purchasers of construction were kept away by these conditions, and the improvement of design and method was badly hampered.

It was in recognition of the exceptional importance of labor relations that the construction code as finally approved established the Construction Planning and Adjustment Board, a unique body to deal with labor problems on a long-range basis. The work of this board gave the first promise of approaching a solution of difficulties of long standing. It brought employers and employees together and caused them to face the facts, and by laying a foundation for progress it convincingly proved the necessity of continuing the cooperative study of construction labor relations.

To discontinue the work of the Planning and Adjustment Board now would be to lose a large advance. It would be a setback for every interest connected with construction. Construction's first need is to maintain the board or its equivalent and insist on carrying forward the work—whether by the action of construction interests themselves or by joint action of the industry with the federal government. Hearty support of the effort to improve labor conditions holds out the largest and most immediate hope for the modernization and stabilization of construction.

CURRENT NEWS

Pooling of Funds For Highways Is Proposed

PRESIDENT ROOSEVELT is favorably impressed by the plan for pooling the $400,000,000 relief works allotment for roads and grade-crossing elimination with state roads funds, with no limitation as to its use except that each state will guarantee to employ on highway work for one year the same number of workers from relief rolls that would be absorbed by applying the $1400 man-year requirement to its relief work allotment.

This plan to accomplish the objective of the relief works program and at the same time maintain the usual standards of highway construction was suggested by Henry G. Shirley, chairmain of the state highway commission of Virginia, and submitted to President Roosevelt by Thomas H. MacDonald, chief of the Bureau of Public Roads. Harry Hopkins, Works Progress Administrator, is studying the proposal. On the basis outlined, each state would contract with the federal government to employ the requisite number of men.

The plan would permit state highway departments to proceed with previously developed construction programs without further delay. The labor quota that they would be required to absorb from relief rolls is determined by dividing their relief work allotment by $1400 per man-year but actual construction work would be carried forward without reference to this requirement that would apply if the relief work allotment were segregated from other funds.

Simplification of Highway system asked

The Shirley plan was unofficially endorsed by the executive committee of the American Association of State Highway Officials which met in Washington June 17. In addition to its routine business, the committee adopted the policy that it will not approve the establishment of any additional U. S. numbered routes. A special committee was appointed to investigate the practicability of simplifying, consolidating and dignifying the U. S. numbered system, which would include a possible reduction in the mileage of such U. S. numbered roads. The committee, which is composed of Robert Kingery, Ill.; F. R. White, Iowa; F. E. Everett, N. H.; and Gibb Gilchrist, Tex., is instructed to report whenever they have arrived at a definite conclusion.

New A.A.S.H.O. officers

By letter ballot vacancies on the executive committee due to resignation of Samuel Eckels, of Pennsylvania, and W. V. Buck, now connected with the Bureau of Public Roads, were filled by F. E. Everett, of New Hampshire, and Robert Kingery, of Illinois.

Miami, Fla., was chosen as the meeting place of the Association, December 9-12.

East River Tunnel Authority Named by New York Mayor

Three men have been named as members of the Queens-Midtown Tunnel Authority by Mayor La Guardia of New York City. The authority was created by the New York state legislature this year with power to construct and operate a vehicle tunnel between 38th St., Manhattan, and Long Island City.

The men appointed to the authority are Alfred B. Jones, William H. Friedman, and Albert T. Johnston. No funds are available for the construction of the tunnel. The authority will endeavor to issue bonds secured by expected toll from the tunnel, in order to finance its construction. The work is estimated to cost about $58,000,000, and will take at least six years for completion.

London Plans Large Extension of Transportation System

Transportation improvements for Greater London, England, involving the expenditure of $165,000,000 have just been announced by the national government. When the plan has been given parliamentary sanction, which is expected, the London Passenger Transport Board, which controls all the passenger traffic in most of London, the London and Northeastern Railway and the Great Western Railway will begin work on the improvement at once.

The government is expected to guarantee loans which will enable the whole program to be started at one time. Estimated time for completion of the work is five years. Details are not yet available, but it has been announced that the work will include the construction of 12 mi. of new tube railway, and the substitution of trolley autobuses for street cars on 148 mi. of street, and the electrification of suburban passenger services into the Liverpool Street station.

Canadian Housing Program Introduced in Parliament

Plans for a $50,000,000 program of residential construction have been introduced in the House of Commons at Ottawa. The measure contains two major provisions: under the first, a fund of $10,000,000 is set up to be loaned to individuals or companies who will build houses, and who are able to secure 60 per cent of the appraised value from a mortgage or loan company. The amount of a loan which may be made from the government funds is 20 per cent of the appraised value. Interest rates and terms of amortization are determinable by the Minister of Finance.

Under the second provision of the measure, the Economic Council is instructed to study and report upon the adequacy of existing housing accommodation in Canada.

Rules Laid Down For Contract Work On Relief Operations

Washington Correspondence

NEW LIFE was injected into the PWA campaign for public works this week by the rally in Washington of state directors and engineers, many of whom have been discouraged by Harry Hopkins' squad of work-relief administrators who, in their enthusiasm, have spread the impression throughout the country that PWA is defunct.

Employment of contractors

Regulations prescribed by the President on June 24 require that all projects must be prosecuted under one of four methods—force account, fixed price contract, limited-price contract and management contract. The method may be designated in the application for the allotment but be subject to the approval of Works Progress Administrator Harry L. Hopkins, who may designate another method to be used.

New regulations

On each job, by whatever method prosecuted, not fewer than 90 per cent of all employees, with some few exemptions, must be taken from relief rolls and be certified by the United States Employment Service.

Section 1 of the regulation (Regulation No. 3) is given over to definitions, the principal one being the word "project" as used in the regulation. It is defined as "any project which is financed in whole or in part from funds appropriated by the Emergency Relief Appropriation Act of 1935, except work relief projects conducted by state emergency relief administrations. Section 2 outlines the four methods of prosecution given above. The sections describing the methods of prosecution are as follows:

Section 3. *Force Account*—The force-account method shall involve (a) the employment by the supervisory agency of the persons working on the project, and (b) the supervision of the project by the supervisory agency.

Section 4. *Fixed Price Contract*—The fixed-price contract shall be awarded on the basis of competitive bids submitted on complete drawings and specifications. Such contract shall provide, among other things, that:

(a) The contractor shall be paid a fixed sum for the complete project, or for specified units, determined by competitive bidding, which sum shall include all items of cost except the cost of the materials, supplies, and equipment which are to be furnished, pursuant to the specifications, by the government.

(b) The contractor shall be obligated to perform, directly and without subcontracting, not less than 25 per cent of the project, to be calculated on the basis of the contract price and the cost of materials, supplies, and equipment furnished by the government.

Section 5. *Limited-Fixed-Price Contracts*—The limited-fixed-price contract shall be awarded on the basis of competitive bids submitted on complete drawings and specifications. Such contract shall provide, among other things, that:

(a) The contractor shall be paid a fixed sum for the complete project, or for specified units, determined by competitive bidding, which sum shall include all items of cost, except the cost of labor (other than supervisory, administrative, and highly skilled labor) employed at the site of the

project, and the cost of the materials, supplies, and equipment which are to be furnished, pursuant to the specifications, by the government.

(b) The contractor shall pay, or cause to be paid, the persons employed on the project wages determined pursuant to Part I, subdivisions (a) to (e), inclusive, of Regulation No. 1, and, except for wages paid to the supervisory, administrative, and highly skilled labor, the contractor shall be reimbursed for such payment.

(c) (Similar to Section 4 (b).)

Section 6. *Management Contract* — The management contract shall be awarded on the basis of competitive bids submitted on a plan or drawings and specifications sufficiently complete to determine the nature and character of the work. Such contract shall provide, among other things, that:

(a) The contractor shall (1) administer, supervise, and manage the project; (2) procure and pay, or cause to be paid, for all materials, supplies, and equipment necessary for the project (except such as the specifications provide shall be furnished by the government), all such procurements to be made on the basis of competitive bidding, pursuant to Section 2 of the Emergency Relief Appropriation Act of 1935, when the aggregate amount involved is $300 or more and under the supervision of the supervisory agency; (3) make, and assume all obligations under, all subcontracts let for the performance of any portion of the work, all such subcontracts to be made on the basis of competitive bidding and under the supervision of the supervisory agency; and (4) pay, or cause to be paid, all persons employed on the project wages determined pursuant to Part I, subdivisions (a) to (e), inclusive, of Regulation No. 1.

(b) The contractor shall be paid, in addition to the fixed sum determined by competitive bidding, for administering, supervising, and managing the project a fixed amount, likewise to be determined by competitive bidding, for the period of the work for each item of plant equipment furnished according to a schedule included in the specifications and shall be reimbursed for all necessary payments made pursuant to the specifications (1) for wages, except payments for the supervisory, administrative, and highly skilled labor, (2) for materials, supplies, and equipment purchased, (3) to subcontractors, and (4) for other items of cost properly incurred.

(c) The contractor shall be obligated to supervise, directly and without subcontracting, not less than 25 per cent of the project, to be calculated on the basis of the total cost of the project which shall include all payments made by the government pursuant to subdivision (b) of this section and the cost of materials, supplies, and equipment furnished by the government.

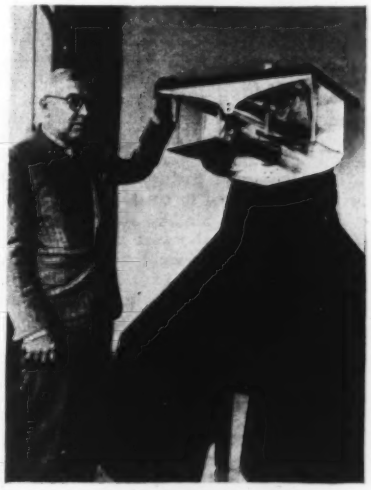
The specifications may include an estimate of the total cost of the project which shall be prepared by the Department or Federal agency submitting the application. Such estimate of the total cost, if included in the specifications, shall serve as a basis for the adjustment of the fixed sum to be paid pursuant to subdivision (b) of this section for the administration, supervision, and management of the project by (1) increasing such sum, in accordance with a stated ratio specified in the contract, if the final cost of the project, as determined pursuant to subdivision (c) of this section, is less than the estimate of the total cost and (2) decreasing such fixed sum, in accordance with a stated ratio specified in the contract, if such final cost of the project is greater than the estimate of the total cost.

Section 7. *Dismissal of Employees*—Every employer of labor on the project shall have the right, subject to disapproval by the supervisory agency, to dismiss any employee.

Section 8. *Notification to Director of Procurement*—The Department or Federal agency submitting an application, unless exempted by the Director of Procurement of the Treasury, after final approval of an allocation of funds by the President and before any force-account work is begun or specifications drawn for competitive bids for the project, shall furnish the Director of Procurement with a statement describing the proposed project and indicating the estimated quantities of materials, supplies, and equipment to be required in connection with such project. The Director of Procurement shall, at such time, indicate to the Department or Federal agency involved the materials, supplies, and equipment which will be furnished by the government and will issue instructions as to the manner and method of their requisition. The government may furnish materials, supplies, and equipment in the case of non-Federal projects only if the government is making a grant of such items.

Sodium Vapor Lighting Adopted For San Francisco Bay Bridge

Sodium vapor light will illuminate the roadway of the San Francisco-Oakland Bay Bridge, according to a recent announcement of Chief Engineer C. H. Purcell. Approximately 1,000 light standards 26 ft. above the roadway and 150 ft. apart will be located on both decks of the bridge.



C. H. PURCELL, state highway engineer of California, exhibiting the type of sodium vapor lamp to be used on San Francisco Bay Bridge

The source of light will be a 3x12-in. glass tube containing sodium gas which emits a monochromatic light free from glare. The units on the bridge installation are to have a power of 10,000 lumens.

New York City Evolves Plan for West Side Parkway

Final plans for the extension of New York City's Riverside Park have been agreed upon after a long discussion of the merits of the various methods proposed. The compromise agreement calls for the roofing of the New York Central tracks from 82nd St. to 125th St.

One of the original proposals call for carrying of the express highway over the railroad tracks, and the other calls for carrying the highway along the bank of the Hudson River and leaving the track open. Under the compromise the highway will go along the river bank, but the railroad track will be covered and landscaped, providing a continuous park area along the river.

The cost of covering the railroad track will be met by an assessment upon the Riverside property owners. Although this meets with opposition from the owners, it enables the park commission to accomplish more than could be done with the highway and federal relief funds.

The West Side improvement scheme is intended to accomplish three purposes: the danger and nuisance of the track will be eliminated; the area will be landscaped, providing a recreational area; through traffic from the Holland and Mid-town tunnel will be taken from the congested traffic areas of the city.

Work of grading and filling the area near the river has already been started.

Funds Segregated By Roosevelt For Housing Program

President Roosevelt has segregated $249,000,000 for low cost housing, as recommended by the Advisory Committee on Allotments several weeks ago. This will be drawn down by allotment for individual projects developed by PWA, as approved. The Housing Division of PWA has submitted and the allotment committee has recommended 24 projects in 21 cities for a total of $91,000,000. Acquisition of land is in various stages on all of these projects. All the land needed has been acquired in Milwaukee and Miami. Location of the other projects has not been revealed. All of them will be completed during 1936. The outlay of $33,000,000 already spent for low-cost housing plus the new allocation represents a substantial start toward creating better housing and should set an example to the states and cities according to Administrator Ickes, hence he believes that states and cities should assume the main part of the burden.

"Such housing projects should be carried forward locally," said Ickes, "but the federal government is undertaking it now under the relief works program because nobody else is in a position to do it."

Southwest Rivers Do Damage as Heavy Rains Cause Floods

Throughout the sections of the west that, last year, were suffering from droughts and dust storms heavy rains sent rivers to flood stage causing heavy damage to property and crops. On June 17 the Colorado River rose to the 41-ft. stage in Austin, Tex., and although early reports indicated extensive damage the actual loss was greatly exaggerated. The municipal electric light and water plant was forced to discontinue services for four days while repairs were made.

State Highway Department figures show total damage from floods of the Colorado River and other streams in central and south Texas to be about $2,000,000, of which $1,200,000 represents destruction to several bridges. The rest of the damage was confined to small structures and highways.

Damage in other regions

In southwestern Nebraska the Republican River went to flood stage for the second time in two weeks causing one death and inundating the cities of Trenton and Cambridge with two feet of water. Four railroad bridges, one highway bridge and ¾ mi. of highway were washed out near Oshkosh, Neb., as the North Platte River overflowed its banks.

The Arkansas River, near Fort Smith, Ark., reached 31.2 ft., the highest since 1929. About one-third of the state suffered property and crop loss as rivers broke through levees. Levees at Ned's Lake, near Van Buren, Ark., broke and at Morrilton the Arkansas River washed away two levees. The Petit Jean, normally 30 ft. wide, had reached a width of 1 mi. at Booneville carrying away bridges and houses.

At Bethune, in eastern Colorado, a steel railroad bridge on the Rock Island line and a highway bridge were washed out when extremely hot weather caused the snow in the mountains to melt rapidly.

Weston Fuller Dies: Well Known Sanitary Engineer

Weston E. Fuller, senior partner in the firm of Fuller & Everett, New York, died at his home in Philadelphia on June 22. Mr. Fuller, who has long been known as a consulting sanitary engineer, was born in Phillips, Me., in 1879, and received a degree of civil engineer from Cornell University in 1900. After his graduation he became an assistant in the hydraulic laboratory at Cornell University and the following year became an instructor in the College of Civil Engineering at Cornell University. In 1904 he was made resident engineer on the construction of a mechanical filter at Watertown, N. Y., and the following year became chief draftsman for Hazen & Whipple, consulting civil engineer, later becoming a member of that firm.

In 1922 Mr. Fuller became professor of civil engineering at Swarthmore College where he remained for seven years. He subsequently entered private practice as a consulting engineer specializing in sanitary engineering and public utility valuation. Mr. Fuller served as consultant on the New York-New Jersey water controversy and in the Massachusetts-Connecticut water dispute.

Washington Highlights

BY PAUL WOOTON

Legislation that would superimpose inheritance taxes upon existing estate and gift taxes is expected at this session of Congress. A companion measure may be the proposal of a constitutional amendment aimed at tax-free securities.

A positive statement that there is no thought of abandoning the banking bill comes from the President himself. The administration is relying upon this measure as one of the chief new instrumentalities it will use in attempting to overcome the depression.

In an effort to aid tenant farmers by financing them in the purchase of farm homesteads of their own the Senate has passed the Bankhead farmers' home corporation bill which would establish a $50,000,000 corporation with authority to issue $1,000,000,000 in bonds.

At least twelve major bills remain to be enacted before Congress can adjourn. Social security has been passed by both Houses and is in conference. The same is true of the Wagner labor disputes bill. The banking bill has passed the House but has not been reported in the Senate. Continuation of the excise taxes has passed the House and is awaiting action in the Senate. The same is true of the AAA amendments. The TVA amendments and the holding company bill have passed the Senate and are awaiting action in the House. The Guffey Coal Bill is still before the House committee. The deficiency appropriation bill has passed the House and is under consideration by the Senate committee. Ship subsidies are awaiting action in each House. Transportation regulation has passed the Senate but is pending in the House committee.

Washington, June 24, 1935

Senate Committee Sets $203,000,000 For Rivers and Harbors

AS REPORTED from the Senate Commerce Committee, the rivers and harbors bill includes the provisions of the Johnson bill, previously passed by the Senate, to legalize Parker dam, Grand Coulee dam, and other projects whose status was jeopardized by the U. S. Supreme Court's decision in the litigation instituted by the state of Arizona. Inclusion of these provisions was prompted by opposition in the House to the Johnson bill. Favorable action by the House is now assured.

The rivers and harbors bill includes 124 projects, estimated to cost $203,053,157, for which PWA has already allotted $164,737,899. Projects authorized which have not received allotments from the PWA number 127 at an estimated cost of $167,470,715. The last river and harbor bill was approved in July, 1930. Rapid progress has been made on many projects in the meantime with PWA allotments but the Senate committee points out that the present bill is intended to provide a definitely rounded-out plan for continued improvement of rivers and habors.

With reference to projects that have been undertaken by PWA, without specific authorization by Congress, the committee said that it is deemed advisable to provide for the permanent maintenance of projects undertaken with public works funds by having these projects specifically adopted by act of Congress.

Great Lake channels

The bill provides for dredging 18 Great Lakes ports to correspond with the depths provided in the connecting channels that, by the River and Harbor Act of July 3, 1930, were authorized to be increased from a depth of 21 ft. to depths suitable for vessels with a draft of 24 ft. Such channel improvement is now nearly completed at a cost of $20,000,000. The committee reported that unless port depths are increased, shipping will be severely handicapped as extreme droughts have brought lake levels down to the lowest stage reached in 75 years.

The bill also provides for deepening the New York barge canal from 12 to 14 ft. The Senate committee deleted a proviso adopted by the House requiring that the $27,000,000 authorized shall not be allotted unless the state of New York agrees that no toll charges will be imposed for use of the improved waterway.

Among projects for which preliminary surveys by the Corps of Engineers are directed is the deep waterway to connect Lake Saint Francis on the St. Lawrence River with the Hudson River at Albany by way of Lake Champlain.

Federal investigations limited

The present authorization bill includes a proviso by the Senate committee that "hereafter federal investigations and improvements of rivers, harbors and other waterways shall be under the jurisdiction of and shall be prosecuted by the War Department under the direction of the Secretary of War and the supervision of the Chief of Engineers, except as otherwise specifically provided by Act of Congress."

Grade of "Fellow" Proposed In the Am.Soc.C.E.

Proposed amendments to the constitution of the American Society of Civil Engineers, now being circulated among the members for consideration, include the establishment of a new grade known as "Fellow" and the elimination of the present grade of "Associate Member." Under the proposed arrangement the corporate members of the society will be designated as fellows and members. There also will be honorary members, affiliates, junior members and student members.

Under the proposed change, the following is to be substituted for related material now in the constitution: "After Nov. 15, 1935, fellowship in the society shall be confined to persons who have become notable in the practice of engineering. After Nov. 15, 1935, a fellow, at the time of his admission to that grade, shall have been a member of the society for not less than 10 years and shall have been engaged in the active practice of his profession for not less than 25 years and for at least 10 years thereof shall have been responsibly engaged in work of substantial importance requiring engineering ability of a high order. The board of direction, by not less than an 80 per cent vote of the entire board, may waive the requirements as to membership and length of experience and elect an engineer to the grade of fellow on the basis of exceptionally distinguished achievements."

It is proposed to provide for the transition from the present arrangement of having the corporate membership made up of members and associate members to the new set-up of having the corporate membership made up of fellows and members by inserting a "grandfather clause" in the constitution which reads as folows: "On Nov. 15, 1935, all members who have held that grade for 10 years and who have had 25 years of active practice, shall be termed fellows; associate members shall be termed members; and juniors shall be termed junior members. For a period of two years following Nov. 15, 1935, any member may apply without endorsers to the board of direction for transfer to the grade of fellow, and the board, after satisfying itself of the applicant's qualifications, may transfer him to that grade by not less than an 80 per cent vote of the entire board. On and after Nov. 15, 1937, transfer to grade of fellow shall be upon application favorably endorsed by seven fellows, and approved by not less than 80 per cent of the board, or as provided in Article II, Section 2, for recognition of exceptionally distinguished achievements." Article II, Section 2, is the section previously quoted.

Licenses Required For Bidders on Florida Highway Work

The state road department of Florida has announced the requirement that all contractors who bid on public highway projects will have to obtain state licenses at a cost of $1,000 annually.

The announcement came as the result of a law passed by the 1935 legislature which requires that every person who offers or bids to construct any public highway, street, or other public building project must obtain from the state comptroller an annual license.

Deficiency Bill Carrying Funds For TVA Passes House

Carrying an appropriation of $173,509,192, the second deficiency bill passed the House June 21. An appropriation of $34,675,192 to the Tennessee Valley Authority provides for commencing construction of the Guntersville Dam and the Chickamauga Dam at an estimated cost of $17,000,000 and $15,000,000 respectively. Construction of Hiwassee Dam, which is estimated to cost $12,000,000, is postponed for another year.

In providing for the two new dams, the House Committee on Appropriations explained that it is actuated by a desire to include projects in the program which seem to be most beneficial to flood control and navigation. The navigation program of the Tennessee River ultimately contemplates a 9-ft. channel from the confluence of the Tennessee and Ohio Rivers at Paducah, Ky., to Knoxville, Tenn. Guntersville Dam will provide a 7-ft. channel from Paducah to Chattanooga. The Chickamauga Dam will help to provide a 7-ft. channel for about 70 mi. above Chattanooga but the main benefit to accrue from this dam is in flood control. Both Guntersville and Chickamauga dams are susceptible of power development but such installations, the committee said, are not contemplated until there is a need for its generation. The Aurora Dam, just above Paducah, is considered essential to a 9-ft. channel but its practicability has not been determined, due to uncertain foundation conditions. The committee stated that this dam has a place in the ultimate program but not during the fiscal year 1936.

Final payment for Boulder Dam included

To make final payment for construction of Boulder Dam and to provide for part of the power machinery, which is already under contract, the bill carries an appropriation for $14,000,000. Water is now being impounded in the reservoir and it is expected that generation of power will start about the first of the year. The House committee reported that another appropriation of the present size will be required in the fiscal year 1937 for completion of the project.

An appropriation of $10,000,000 for rivers and harbors improvements which, the committee said, do not lend themselves to financing under the work relief program, includes $8,244,000 for Bonneville Dam, to complete initial construction of locks, power house, spillway, and fishways. With this appropriation a total of $39,484,700 has been allocated to complete construction now proposed. The committee reported that it may be necessary later to install eight or ten additional generating units.

An appropriation of $9,850,000 for military construction includes various building improvements at West Point to cost $5,324,250 and commencement of construction of the projected airdrome in Hawaii, $4,525,750.

An appropriation of $64,000,000 to the Treasury Department will put a new public building of some description in practically every Congressional district in the country. Of this sum $58,000,000 is for buildings outside the District of Columbia and $6,000,000 for increasing the space of the Government Printing Office, the Bureau of Engraving and Printing and the General Accounting Office in Washington. Selection of building projects will be made from lists which include 1,513 projects, with an estimated aggregate cost of $136,293,500. The Secretary of the Treasury and the Postmaster General may also select such other projects "as in their judgment are economically sound and advantageous to the public service."

An appropriation of $13,874,000 for the Navy Bureau of Yards and Docks includes $10,000,000 for a floating dry-dock at Pearl Harbor, Hawaii. The Veterans Administration will enlarge facilities at numerous hospitals with an appropriation of $20,000,000.

Project Information Issued by Progress Administration

Of special interest to city engineers and sponsors of projects under the Relief Works Program is a bulletin issued by the Works Progress Administration which sets down regulations concerning the filing of applications and the carrying out of the project.

Types of acceptable projects, as well as the rules governing the planning of such projects, are outlined. A specimen project proposal is included in the bulletin along with instructions for filing the proposal. The proposal as it appears in this bulletin is tentative and is furnished solely for guiding the preliminary planning of projects, which will meet the requirements of the program. Projects prepared in accordance with this form, and with the instructions accompanying it, can, however, be readily adjusted to fit the final procedure as described by the Works Progress Administration. The administration will, from time to time, develop working procedures for the approved types of projects.

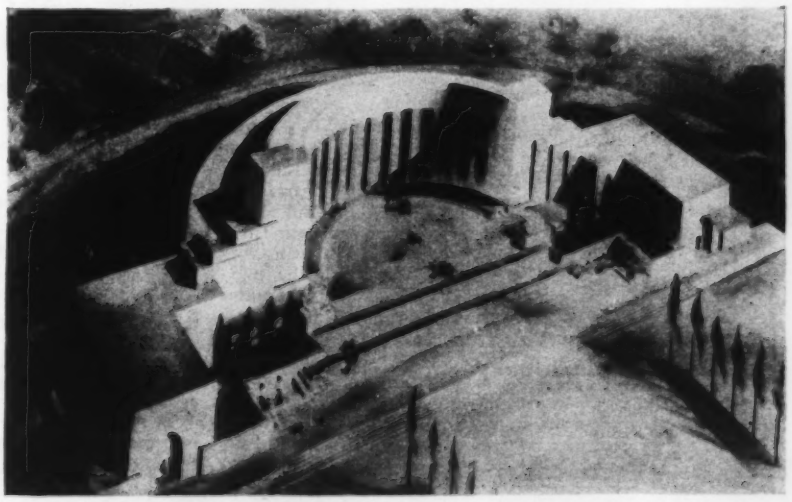
Walsh Bill To Fix Wages Backed by Administration

The Administration is pushing the Walsh bill to bind all contractors supplying the government with goods or services to such minimum wages and maximum hours as may be fixed by President Roosevelt. Such standards will be designated in the invitation to bid either specifically or by reference, presumably to previous NRA requirements. Employment of child labor would be prohibited.

With practical unanimity, firms doing business with the government are accepting in advance the conditions imposed by the Walsh bill by agreeing in all bids filed prior to its enactment to abide by the wage and hour requirements that may be established later. The bid price must cover such requirements. Standards to be imposed under the Walsh bill certainly will not be higher, probably will be lower than code provisions, according to the procurement division of the Treasury Department.

Wage requirements in present contracts

All government departments and agencies, with the exception of the War Department, are inviting bids and awarding contracts with the stipulation that the wage and hour requirements to be imposed will be adhered to. The Adjutant General's Office has issued instructions to its depots to award no new contracts other than those essential to current conduct of the department or to cover purchases from funds which would otherwise revert to the Treasury if not contracted for by the end of the fiscal year on July 1. Opening of bids already received will be postponed until after that date. The Corps of Engineers is not affected as construction projects for which it has received allotments are not yet ready for contracting.



PROPOSED STATE OF TEXAS BUILDING FOR TEXAS CENTENNIAL EXPOSITION

An Architect's rendering of the State of Texas Building to be erected in Dallas for the exposition celebrating 100 years of independence from Mexico.

The design, which is characterized by its simplicity of line and massiveness, was developed by George Dahl, supervising architect of the exposition. Bids on the structure will be received on Aug. 15. Native Texas stone or plastic concrete will be used and alternates will be asked on different materials for the building, which will be 450 ft. long, 250 ft. in depth and 90 ft. high.

Designs for other permanent buildings will be selected from drawings submitted by Texas architects. The design work on each building will go to the architect submitting the best plan and others will be paid for their work so that the best features of their designs may be incorporated in the final plans.

Projects on Lower Colorado River Get $20,000,000 Allotment

Two allotments totaling $20,000,000 for work on the lower Colorado River in Texas have been approved by President Roosevelt. Although one allotment of $15,000,000 went to the PWA, and the other of $5,000,000 to the Bureau of Reclamation, the money will be spent on one project.

The combined allotment is for the completion of a dam started by private interests three years ago, and also provides for a unified system of dams and reservoirs to afford flood control, irrigation and the development of hydro-electric power. The $15,000,000 allotted to the PWA will be used to finance the Lower Colorado River Authority which was created recently by the state of Texas. The authority will use the allotment in completing the dam and other parts of the project. The loan will be secured by bonds underwritten by the authority, and will be paid for from the sale of water and power. Flood control and irrigation phases of the unified project will be carried out under the Bureau of Reclamation.

Added Funds for Canalization On Upper Mississippi River

The canalization of the upper Mississippi River to provide a 9-ft. channel to St. Paul, Minn., has been started with an appropriation of $7,500,000 provided for this purpose by Congress. Allotments totalling $51,495,000 were provided by the Public Works Administration for the continuation of this project, which will require the eventual construction of 27 locks and dams.

The funds appropriated by Congress and provided by the PWA are sufficient for the completion of twenty of the locks and twelve of the dams. There remains for completion of the entire project the construction of seven locks and fifteen dams. An allotment of $25,000,000 has been provided under the Emergency Relief Appropriation Act for the continuation of the work. This money will be applied to the construction of five of the remaining seven locks at Red Wing, Minn.; Clinton and LeClaire, Ia.; New Boston, Ill., and Cap Au Gris, Mo., and four of the remaining dams at La Crosse and Genoa, Wis.; Dubuque and Burlington, Ia., and other minor miscellaneous work.

Treasury Department Asks Bids For New Interior Building

Bids for construction of the new Department of Interior Building have been asked by the public works branch, procurement division of the Treasury Department. The bids on the building, which has been allocated $11,110,000, will be opened July 19.

It is to be the first government building to be equipped with escalators. Among other features of the seven story building is the open court construction with 4,400 windows spaced 12 ft. on centers providing the best lighting of any public building in Washington. The building was designed by W. B. Wood, Washington architect, who had been retained by the Supervising Architect's office.

SOCIETY CALENDAR

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual convention, Los Angeles, July 3-5.

AMERICAN SHORE AND BEACH PRESERVATION ASSOCIATION, summer meeting, Ocean City, N. J., July 11-13.

INSTITUTE OF TRAFFIC ENGINEERS, sixth annual meeting at Louisville, Ky., October 15-16.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS, annual convention, Miami, Fla., December 9-12.

NEW ENGLAND WATER WORKS ASSOCIATION, fall convention, Providence, R. I., Sept. 17-20.

DETROIT ENGINEERING SOCIETY recently elected the following officers: president JOHN H. HUNT; vice-presidents, W. D. CAMERON and JOHN W. KENNEDY; secretary-treasurer, C. J. FREUND, and managing secretary, E. L. BRANDT.

Milwaukee Sewage Extension Brings Infringement Suit

Although the extension to the $1,850,000 Milwaukee sewage treatment plant will not be ready for service for several weeks, Milwaukee and the Metropolitan Sewerage Commission have been sued for infringement of an activated sludge patent. The suit has already been upheld by the appeals court. Ten contractors are also included as infringers.

Only Half Pass Examination for License in California

A recent written examination held by the State Board of Registration for Civil Engineers in California resulted in passing grades for a greater percentage of candidates than in any examination previously given by the Board. Of those taking the examination for registration as civil engineer, 50 per cent passed successfully; for authority to use the title, structural engineer, 45 per cent passed and of those applying for the rating of land surveyor only 25 per cent passed.

THE WORKS PROGRAM

Allotments Approved to Date

Original Appropriation		**$4,000,000,000**
Statutory Allocation		
Dept. of Agriculture (highways and grade-crossings)		100,000,000
Presidential Allocations		
Dept. of Agriculture		439,077,500
Grade crossings and highways	$400,000,000	
Soil Conservation	25,000,000	
Forest Service	13,827,500	
Dept. of Interior		43,446,500
Grand Coulee Dam	23,000,000	
Casper-Alcova	10,000,000	
Rural Electrification Administration		75,000
Emergency Conservation Work		222,634,000
CCC	219,158,000	
War Dept.		109,202,272
Passamaquoddy Tidal Power	10,000,000	
Locks and Dams on Upper Mississippi	25,000,000	
Fort Peck Dam	15,000,000	
Federal Emergency Relief Administration		430,000,000
General Accounting Office		6,000,000
Navy Dept.		15,242,615
Resettlement Administration		1,250,000
Treasury Dept.		100,000
Works Progress Administration		100,000
Civil Service Commission		325,000
PWA		15,980,500
National Emergency Council		250,000
National Resources Board		100,000
Dept. of Commerce		20,000
Total		$1,383,803,387
Unallocated Balance		**$2,616,196,193**

Personals

COL. R. T. WARD of the Engineer Corps, stationed at Baltimore, Md., will be transferred to New York about June 30.

HARRY S. BERRY, who in 1933, served as Tennessee PWA engineer, is now serving as works progress administrator in that state.

THEODORE W. NORCROSS, chief engineer of the U. S. Forest Service, has been awarded an honorary degree of master of science by Tufts College.

C. GLENNON MELVILLE, engineer of construction for the firm of Modjeski, Masters & Case, Inc., on the new bridge being built across the Mississippi River at New Orleans, La., has been awarded an honorary degree of doctor of engineering by Tulane University.

I. P. SHELBY, Little Rock, Ark., civil engineer, has been appointed maintenance engineer of the Ninth highway district with headquarters at Harrison, Arkansas, to succeed F. H. BURNSIDE of El Dorado, who has been transferred to duty as resident engineer.

C. P. WATSON, vice president of the Louisville, Ky., Engineers and Architects Club, has been elected a member of the board of trustees of the Louisville Bridge & Iron Co. Mr. Watson has also assumed the duties of vice president and general manager.

ROBERT E. KENNEDY, formerly of Bismarck, N. D., has been appointed assistant engineer by the Bureau of Reclamation, and has been assigned to the department of project investigations with headquarters in Denver. Previously Mr. Kennedy was state engineer of North Dakota for eight years.

CHARLES T. MAIN, Winchester, Mass., construction engineer of Charles T. Main, Inc., Boston, Mass., has received the honorary degree of doctor of engineering from Northeastern University, Boston. Mr. Main is past president of the American Society of Mechanical Engineers, and of the Boston Society of Civil Engineers.

EDWARD E. WALL, consulting engineer of St. Louis, has received an honorary degree of doctor of laws from the University of Missouri. Mr. Wall, who has served as directory of public utilities in St. Louis, is a graduate of Missouri University and has been well known for his development of water supplies.

OLIVER D. DALES, chief civil engineer of the Buffalo, Niagara and Eastern Power Corp., was awarded a bachelor of science degree at the commencement exercises of Michigan State College. Mr. Dales has been identified with power development on the Niagara frontier for 31 years. He studied civil engineering at Michigan State College and prior to the completion of his studies was engaged in engineering work for the C. & N. W. R.R. in Iowa and Minnesota during 1903. He resumed his studies in 1904. Mr. Dales is a member of the American Society of Civil Engineers and the Buffalo Engineering Society.

Obituary

OTTO KOCHTITZKY, veteran drainage engineer, who in 1915 designed and built the Little River drainage system in Missouri involving 1,000 sq.mi. of land, died June 22, in Cape Girardeau at the age of 80.

JOSEPH M. DARLING, president of the Joseph M. Darling Co., Fall River, Mass., died at his home in Riverside, R. I., on June 19 at the age of 76. He had been identified for many years with construction work for the government.

FREDERICK N. CONNET, former chief engineer of the Builders Iron Foundry, Providence, R. I., died at his home in that city, June 18. Mr. Connet, who has made many contributions to hydraulic engineering, is best known for his development of an automatic register for the Venturi tube.

CHARLES F. SWIGERT, president of the Pacific Bridge Co., contractors on the foundation work of the new San Francisco bridges, died in San Francisco, June 23, at the age of 72. Mr. Swigert has been engaged in bridge foundation work for the last 54 years, and for 51 of these years was associated with the Pacific Bridge Co.

R. KEITH COMPTON, for 12 years Director of Public Works, Richmond, Va., and for many years prominently identified with engineering work, died at his home in Richmond on June 21. Much of Mr. Compton's engineering activities were centered in Baltimore. He became assistant engineer of sewers in Baltimore in 1890 and continued in that post until 1898, when he became resident engineer for the United Railways & Electric Co.. He remained in that position for two years and in 1900 became superintendent of underground construction for the Pittsburgh & Allegheny Telephone Co. Returning to Baltimore in 1901, Mr. Compton again became assistant engineer on sewer construction work for the city, serving until 1905. For the following five years he was assistant engineer in charge of street maintenance and paving. He was appointed chairman of the Paving Commission in 1911 and in 1913 also took over the duties of chief engineer of the commission. He resigned in March, 1917, to serve with the Engineer Corps during the war. He rejoined the paving commission after the war and in 1924 resigned to become Director of Public Works at Richmond.

CONSTRUCTION STATISTICS OF THE WEEK

ENGINEERING construction awards for the week total $31,825,000, of which $20,858,000 is public work and $10,967,000 private construction. Of the public awards, $9,167,000 is federal and $11,691,000 state and municipal. This total is slightly lower than last week due to lower public awards.

All classes of public are lower with the exception of waterworks at $2,414,000 and sewers at $1,286,000, while all classes of private are higher, including commercial buildings at $2,178,000, industrial buildings at $4,191,000, bridges at $1,075,000 and unclassified at $1,303,000.

The larger awards include an annex to the Congressional Library at Washington, D. C., $6,269,000; widening and straightening Delaware Ave., Buffalo, N. Y., by day labor, $500,000; highway work by Washington, $465,000; superstructure and substructure for the Henry Hudson Bridge, New York City, $1,138,000; second portion of Bills Brook Dam for Hartford, Conn., water supply system, $551,000; complete water system, including dam, filtration plant, reservoir and pipe lines at Fort Smith, Ark., $1,400,000; two generators for the Bonneville Dam for U. S. Engineers, Portland, Ore., $1,188,000; 4,555,000 cu.yd. dredging near New Orleans, La., for U. S. Engineers, $512,000. Among the private contracts is a chemical plant at Monsanto, Ill., for the Monsanto Chemical Co., St. Louis, Mo., $500,000; warehouse for J. S. Finch & Co., Schenley, Pa., $500,000; cold reducing mill for American Rolling Mill Co., Middletown, O., $3,500,000; completing superstructure for bridge between St. Charles and St. Louis Counties, Mo., for Wabash Railway Co. and St. Charles Bridge Co., $1,041,000; 85 mi. oil pipe line between Samfordyce oil fields and Port Isabel and Brownsville, Tex., for Cortez Oil Co., Fort Worth, Tex., $400,000.

State and municipal bond sales for the week totaled $6,259,000. Reductions and rescissions of PWA allotments again exceeded reallotments with the net result of lowering the amount of PWA allotments outstanding by $3,019,000.

CONTRACTS
(Thousands of Dollars)

	June 1934	Weekly Average Week Prev. 4 Weeks	June 27 1935
Federal Government	$5,624	$5,170	$9,167
State and municipal	17,343	10,564	11,691
Total public	$22,967	$15,734	$20,858
Total private	4,531	11,611	10,967
Week's total	$27,498	$27,345	$31,825
Cumulative to date:			
	1934...$712,974,000	1935...$657,271,000	

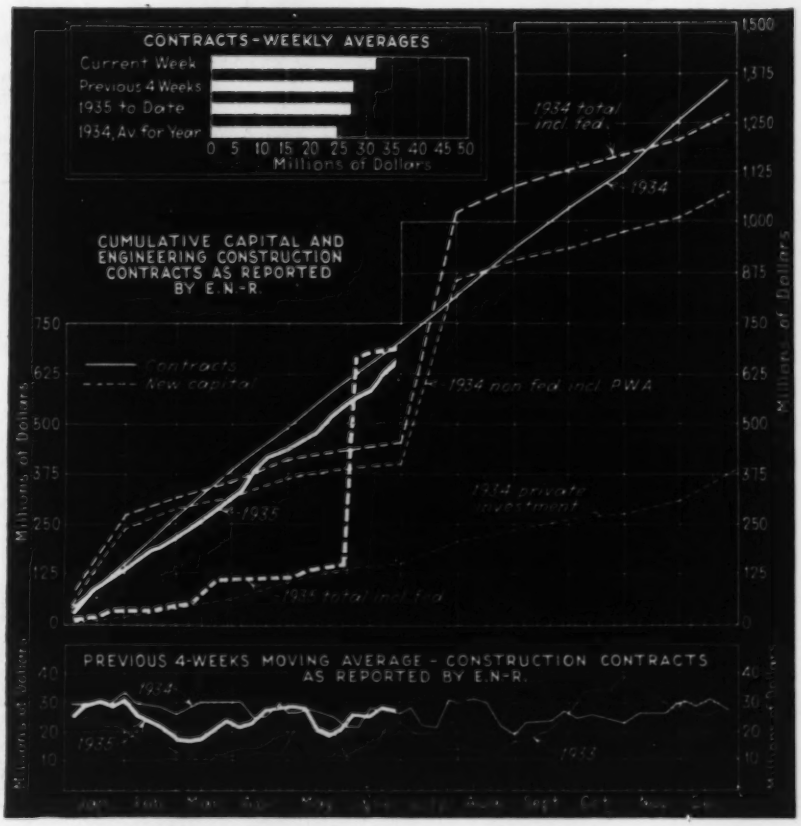
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1935	Week June 27	Cumulative
State and municipal	$6,259	$197,590
PWA allotments, S&M.	—3,019	—52,036
RFC loans, S&M	.....	84
Corporate issues	.....	.....
PWA allotments, private	—560	8,059
Total, Non-Federal	$2,680	$153,697
PWA allotments, Federal Constr.	—147	531,941
Total new capital	$2,533	$685,638
Cumulative to date:		
	1934...$448,118,000	1935...$685,638,000

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for Federal construction. Negative amounts in PWA totals indicate excess of rescissions and reductions over reallotments and increases in outstanding allotments.

INDEX NUMBER

E.N.R.-Cost	1913 = 100	1926 = 100	E.N.R.-Volume	1913 = 100	1926 = 100
June, 1935	**194.78**	**93.63**	**May, 1935**	**100**	**52**
May, 1935	194.06	93.28	Apr., 1935	130	57
June, 1934	199.61	95.95	May, 1934	101	44
1934(Av.)	198.10	95.23	1934(Av.)	114	50
1933(Av.)	170.18	81.80	1933(Av.)	102	47
1932(Av.)	156.97	75.45	1932(Av.)	127	56



Construction Equipment and Materials

Ten-Ton Clam-Shell Bucket For Removing Heavy Rock

The Wellman Engineering Co., Cleveland, Ohio, has recently designed and built an entirely new type heavy-duty, Williams clam-shell dredging bucket. This bucket, of 3½ cu.yd. capacity, weighs over 20,000 pounds. It is constructed of welded alloy steel, normalized for grain structure; heat-treated shafting; alloy steel rivets and manganese steel teeth. It was designed to handle heavy rock in the removal of breakwaters and has been used to remove an 18 ton piece of concrete from 15 feet of water.

The welded design utilizing alloy steel made possible its greatly increased strength with a minimum weight, and produced a bucket structure with far superior ductility and impact values than are possible with the use of steel castings. It is estimated the upkeep expense will be much less than in previous designs, due to the high physical values of the materials used in its construction.

New Wagon Scraper Built To Do Many Jobs

A scoop-up and carry scraper, a dump wagon and a distributing unit are all embodied in the Continental wagon scraper built by the Continental Roll & Steel Foundry Co., East Chicago, Ind.

The Continental is a complete dirt moving outfit of 5 yd. capacity. All operations can be performed with only one handling of the material. The material can be deposited in any manner for windrowing, stock-piling or backfilling. The Continental wagon scraper will scoop its own load and is designed for heavy digging, electrically welded alloy steel being used in its construction. Operation of the scraper is controlled hydraulically by one lever convenient to the tractor operator. The scraper which is designed for use in all kinds of soil is carried on two low pressure pneumatic-tired wheels mounted on roller bearings.

High Yield Point Steel Contains Copper, Nickel and Molybdenum

The Republic Steel Corp., Youngstown, Ohio, has developed a new copper-nickel-molybdenum steel which offers a combination of high strength, ductility and resistance to atmospheric corrosion. Designated "double strength steel," the new material shows an average yield point of from 80 to 90 per cent of its tensile strength and a 30 to 35 per cent elongation in 2 inches (after heat treatment). It is claimed that the physical properties of the material can be increased from 15,000 to 20,000 lb. per sq.in. by tempering the sheets at 900 to 1,000 deg. for about one hour. The new steel is made in two grades, the chemical and physical specifications of which are as follows:

GRADE 1

Carbon	0.12 max.
Manganese	0.50 to 1.0
Copper	0.50 to 1.5
Nickel	0.40 to 0.80
Molybdenum	0.20 max.
Yield point	60,000
Tensile strength	75,000
Elongation in 2 in.	25 per cent min.

GRADE 1-A

Carbon	0.30 max.
Maganese	0.50 to 1.0
Copper	0.50 to 1.50
Nickel	0.40 to 0.80
Molybdenum	0.20 max.
Yield point	70,000
Tensile strength	90,000
Elongation in 2 in.	18 per cent min.

Each of the several alloying elements used in "double strength steel" contributes special properties. The copper was added to increase the yield point and improve rust resistance. The nickel combines in the iron with the copper and has a toughening effect, increasing the Izod resistance of the steel. The molybdenum has the effect of holding both the copper and nickel in solution in the iron.

BACKFILLING—One of the many ways material can be placed with a Continental.

New Equipment in Brief

Diesel Starting Batteries. To provide adequate voltage for starting diesel engines with the required high cranking speed The Electric Storage Battery Co., Philadelphia, Pa., has developed a new line of batteries particularly designed for currents up to 1,600 amp. Considerable study has been given to the construction of these batteries to make them of maximum durability. Extra heavy flexible lead plated copper connectors are used between cells to eliminate possible breakage from vibration or expansion due to temperature. Several types and sizes are available for meeting the requirements of various engine sizes from 25 to 600 horse power where the required voltage varies from 12 to 115 volts and the current from 300 to 1,600 amp. These batteries are designed for trucks, tractors and road construction machinery.

New Publications

THE UNIVERSAL DEVICES FOR ANCHORING NEW CONCRETE TO OLD, American Expansion Bolt & Mfg. Co., Chicago, 9x11½, 7 pages.

BEAUTIFUL LOW-COST BRIDGES, Armco Culvert Mfrs. Association, Middletown, Ohio. 8½x11, 47 pages.

WALWORTH HI-TEST IRON PIPE FOR WATER AND GAS, Walworth Co., New York. 8½x11, 6 pages.

SHALER SHAKER, Ajax Flexible Coupling Co., Westfield, N. Y., 8½x11, 4 pages.

GOODRICH SILVERTOWN "Commercial 12", B. F. Goodrich Co., Akron, Ohio. 8½x11, 11 pages.

PLANNING GRADE SEPARATIONS FOR STABILITY AND ECONOMY, Armco Culvert Mfrs. Association, Middletown, Ohio, 8½x11, 6 pages.

ROAD MAINTENANCE WITH BARRETT TARVIA, Barrett Co., New York City. 6x9, 52 pages.

MURPHY DIESEL ENGINES, Murphy Diesel Co. Ltd., Milwaukee, Wis. 8½x11, 16 pages.

TYPE XPV STEAM DRIVEN COMPRESSORS, Ingersoll-Rand Co., New York City. 8½x11, 48 pages.

COMPUTING QUANTITIES OF AGGREGATE, BINDER-SOIL AND CALCIUM CHLORIDE FOR COMPACTED STABLIZED GRAVEL ROADS, Calcium Chloride Assn., Detroit, Mich. Handbook of tables for computing materials.

INLAND 4-WAY FLOOR PLATE, Inland Steel Co., Chicago, Ill. 8½x11, 6 pages.

AERIAL TRAMWAY HANDBOOK, American Steel & Wire Co., Chicago. 8½x11, 108 pages. Bound handbook presenting description and specifications for aerial tramways and cableways.

MCCORMICK-DEERING DIESEL POWER UNITS, also four other bulletins describing McCormick-Deering Power Units models P-30, PA-40, PA-50, and 200, International Harvester Co., Chicago. Each bulletin, 8½x11, 4 pages.

CONE VALVES, Golden-Anderson Valve Specialty Co., Pittsburgh, Pa. 8½x11, 18 pages.

SPRAY NOZZLE BULLETIN No. 50, Binks Manufacturing Co., Chicago. 8 pages.

WORTHINGTON VERTICAL SINGLE AIR COMPRESSORS, Worthington Pump & Machinery Corp., Harrison, N. J. 8½x11, 4 pages.

BULLETIN AH-323, Hardinge Co. Inc., York, Pa., Bulletin describes crushing mill equipment and gives comparative costs.

A USEFUL PUMPING UNIT FOR EVERY INDUSTRY, Allis-Chalmers Mfg. Co., Milwaukee, Wis. 8½x11, 4 pages.

BULLETIN 201, Lawrence Machine & Pump Corp., Lawrence, Mass. Booklet describes double suction, horizontally split pumps.

WORTHINGTON HORIZONTAL DUPLEX PISTON PUMPS, Worthington Pump & Machinery Corp., Harrison, N. J., 8½x11, 6 pages.

Current Construction Unit Prices

Southwest Sewage Plant, Chicago

CHICAGO Sanitary District started construction on Division A of its new Southwest Sewage Treatment Works with the award on April 18, 1935, of contracts for aeration and final settling tanks and operating galleries. The proposed works are situated immediately west of the District's West Side Sewage Treatment Works in the village of Stickney. The project consists of furnishing and constructing sixteen aeration tanks, each 434x136 ft. and 17 ft. deep; two operating galleries, each 51x1,090 ft. with a brick and concrete superstructure 16 ft. wide and 9 ft. high; and 32 final settling tanks, together with miscellaneous conduits, pipe lines and equipment.

Alternate proposals were taken on circular and rectangular settling tanks, of 126 ft. diameter and 16 ft. average depth for revolving type sludge removal mechanisms, and 131x95 ft., of 14 ft. average depth, for conveyor type sludge removal mechanisms. The bids also included comparisons of prices for aeration tanks of cantilever and semi-gravity wall construction. Contract was awarded on the basis of circular settling tanks and aeration tanks with cantilever walls. About 15,900 fewer yards of concrete are required for the latter type of tank reflecting an indicated saving of approximately $68,000. The project is financed through PWA funds with minimum wage rates prevailing of $1.50 for skilled and 50c. for common labor, and is scheduled for completion in 840 days.

Five bids on Alternate A, with cantilever wall aeration tanks, ranged from the contract low of $3,190,218 to a high of $4,630,711; on Alternate B, four bids ranged from $3,221,978 to $4,621,316. The following tabulations list the units, totals and quantities on Alternate A only, for the three low bidders. Philip Harrington is chief engineer of the Chicago Sanitary District.

THREE LOW BIDDERS AND TOTAL BIDS—SOUTHWEST SEWAGE PLANT

	Aeration Tanks— Cantilever Walls	Aeration Tanks— Semi-gravity Walls
Alternate A—Circular Settling Basins		
A—Herlihy Mid-Continent Co., Chicago	$3,190,218*	$3,258,593
B—S. A. Healy Co., Chicago	3,548,237	3,651,310
C—John Griffith & Son Co., Chicago	4,425,061	4,499,761
Alternate B—Rectangular Settling Basins		
A—Herlihy Mid-Continent Co., Chicago	3,221,978	3,289,558
B—S. A. Healy Co., Chicago	3,557,009	3,660,082
C—John Griffith & Son Co., Chicago	4,279,201	4,353,901

*Contract

UNIT PRICES, SOUTHWEST SEWAGE PLANT, CHICAGO

	A	B	C
1. Remove top soil—34,000 cu.yd.	$0.36	$0.65	$0.50
2. Earth excavation—550,000 cu.yd.	0.575	0.65	1.25
3. Rock excavation—100 cu.yd.	5.00	5.00	5.00
4. Sand, gravel, broken stone fill—4,000 cu.yd.	2.60	2.75	4.00
5. Furnish untreated wood piles—31,000 l.f.	0.295	0.20	0.35
6. Furnish treated wood piles—165,000 l.f.	0.50	0.44	0.80
7. Drive wood piles—11,400	4.75	4.13	4.50
8. Pile load tests—10	180.00	150.00	150.00
9. Concrete, Class A—14,000 cu.yd.	5.75	6.20	7.00
10. Concrete, Class B—38,500 cu.yd.	7.10	8.00	9.00
11. Concrete, Class C—9,500 cu.yd.	7.90	9.35	13.00
12. Concrete, Class D—23,700 cu.yd.	7.20	9.45	11.50
13. Concrete, Class E—43,100 cu.yd.	9.65	12.47	12.00
14. Concrete, Class F—59,000 cu.yd.	8.35	11.00	10.20
15. Concrete, Class G—12,600 cu.yd.	13.50	16.75	19.00
16. Concrete, Class H—15,750 cu.yd.	13.10	17.10	29.00
17. Plate containers, channels—650	6.00	6.60	8.00
18. Plate containers, tanks—6,250	4.75	6.00	7.00
19. Precast fillets, Type A—34,000 l.f.	1.00	0.70	0.90
20. Precast fillets, Type B—7,100 l.f.	1.25	0.80	1.20
21. Brick masonry—80 cu.yd.	22.00	28.00	20.00
22. Brick filling—200 cu.yd.	22.00	15.00	15.00
23(a). Reinforcement bars—12,900,000 lb.	0.033	0.035	0.04
23(b). Reinforcement bars—12,600,000 lb.	0.033	0.035	0.04
24. Reinforcing mesh—115,000 lb.	0.056	0.053	0.05
25. Misc. & copper bearing steel—900,000 lb.	0.056	0.06	0.07
26. Misc. iron castings—260,000 lb.	0.11	0.08	0.13
27. Misc. bronze, brass, copper—1,500 lb.	1.00	0.90	1.00
28. Galvanizing—450,000 lb.	0.025	0.02	0.02
29. Steel plate expansion joints—13,000 l.f.	0.70	0.84	1.00
30. Copper plate expansion joints—1,850 l.f.	0.75	0.74	1.00
31. Asphalt coating—24,000 sq.yd.	0.15	0.23	0.15
32(a). Sheet mastic—81,400 sq.ft.	0.22	0.29	0.30
32(b). Sheet mastic—88,400 sq.ft.	0.22	0.29	0.30
33. Pipe railing—6,500 l.f.	1.45	1.25	1.25
34. Floor grating—15,500 sq.ft.	1.48	1.22	1.50
35—Misc. woodwork—6.5 M.B.M.	200.00	100.00	100.00
36. Vitrified sewer pipe, 12 in.—500 l.f.	1.50	1.00	1.00
37. Vitrified sewer pipe, 18 in.—200 l.f.	2.50	1.75	2.00
38. Vitrified sewer pipe, 24 in.—200 l.f.	3.00	2.75	3.25
39. Bell & spigot C.I. pipe, std. 12 ft. lengths & over—1,000,000 lb.	0.044	0.055	0.06
40. Bell & spigot C.I. pipe, between 3 ft. & 12 ft.—231,000 lb.	0.056	0.072	0.075
41. Bell & spigot C.I. fittings & all bell & spigot pipe 3 ft. or less in length—347,000 lb.	0.094	0.10	0.10
42. Flanged C.I. pipe, std. 12 ft. lengths, & over—1,000 lb.	0.064	0.066	0.07
43. Flanged C.I. pipe, 3 to 12 ft. lengths—100,000 lb.	0.09	0.095	0.10
44. Flanged C.I. fittings & all flanged pipe, 3 ft. or less in length—180,000 lb.	0.104	0.11	0.11
45. Expansion coupling for cast iron pipe—1,000 lb.	0.20	0.146	0.15
46. Large steel air mains, galleries—lump sum	42,000.00	36,474.00	37,000.00
47. Galvanized air mains, tanks & galleries—lump sum	125,000.00	132,283.00	135,000.00
48. Copper alloy air mains, channels—lump sum	23,000.00	27,548.00	28,000.00
49. W.I. pipe, 1½ in.—1,250 l.f.	0.60	0.38	0.40
50. W.I. pipe, 2 in.—1,600 l.f.	0.74	0.50	0.50
51. W.I. pipe, 2½ & 3 in.—8,800 l.f.	1.60	1.00	1.00
52. W.I. pipe, 4 in.—10,200 l.f.	2.27	1.44	1.50
53. W.I. pipe fittings, 1½ in.—325	0.41	0.47	0.48
54. W.I. pipe fittings, 2 in.—850	0.54	0.74	0.76
55. W.I. pipe fittings, 2½ & 3 in.—10,400	1.90	1.27	1.30
56. W.I. pipe fittings, 4 in.—7,200	2.14	3.44	3.50
57. Chrome C.I. pipe, 2½ & 3 in.—500 l.f.	1.44	1.14	1.25
58. Chrome C.I. pipe, 4 in.—3,300 l.f.	2.10	1.56	1.60
59. Chrome C.I. pipe fittings, 2½ & 3 in.—130	0.80	1.42	1.50
60. Chrome C.I. pipe fittings, 4 in.—260	1.28	2.19	2.25
61. Copper pipe, 1 in. & less—6,000 l.f.	0.34	0.21	0.25
62. Copper pipe, 1½ in.—2,400 l.f.	0.52	0.40	0.40
63. Copper pipe, 2 in.—8,650 l.f.	0.70	0.54	0.55
64. Copper pipe fittings, 1 in. & less—3,400	0.53	0.63	0.70
65. Copper pipe fittings, 1½ in.—1,700	0.82	1.03	1.05
66. Copper pipe fittings, 2 in.—1,800	1.14	1.54	1.60
67. Valves, 1 in. & less—425	1.86	1.67	1.70
68. Valves, 1½ in.—250	5.00	4.13	4.20
69. Valves, 2 in.—210	6.30	5.10	5.10
70. Valves, 2½ & 3 in.—140	16.30	13.00	13.00
71. Gate & check valves, 4 in.—40	24.00	20.40	21.00
72. Globe & angle valves, 4 in.—1,640	25.80	21.10	22.00
73. Gate & check valves, 6 in.—20	38.80	32.70	35.00
74. Globe & angle valves, 6 in.—50	44.40	36.50	36.50
75. Gate valves, 8 in.—30	61.00	46.90	50.00
76. Globe valves, 10 in.—14	109.00	93.40	95.00
77. Floor stands—2	33.30	33.50	35.00
78. Airlift fittings—64 sets	480.00	255.00	255.00
79. Sampling fittings—32 sets	280.00	81.00	81.00
80. Sump pumps—8	460.00	360.00	360.00
81. Recording temp. & pressure gauges—lump sum	390.00	191.00	191.00
82. Monorail track—2,150 l.f.	1.65	1.65	2.00
83. Erect sludge removal mechanisms for final settling tanks—lump sum	17,000.00	21,000.00	50,000.00
84. Erect venturi meter tubes & registers—lump sum	7,000.00	4,819.00	5,000.00
85. Erect gate valves, globe valves, sluice gates, 18 in. & smaller—126 units	22.00	14.42	15.00
85. Erect sluice gates, 24 in. & larger—lump sum	4,600.00	5,080.00	5,100.00
87. Unload & store diffuser plates—lump sum	3,000.00	4,600.00	2,500.00
88. Set diffuser plates—51,000 plates	0.18	0.22	0.15
89. Operate gallery superstructures—lump sum	74,000.00	63,500.00	68,000.00
90. Plant road—lump sum	12,000.00	16,000.00	15,000.00

B. & O. R.R. Relocation, Muskingum Valley

RELOCATING 5½ miles of Baltimore & Ohio R.R. track required as part of the Beach City reservoir on the Muskingum Conservancy project started with the award in May, 1935, of a contract for this work located 1.2 miles northwest of Strasburg, Ohio, to a point 1.5 miles north of Beach City. The contract, awarded by the U. S. Engineer Dept., Zanesville, consists of constructing the railroad complete, the piers and abutments for the bridge across Sugar Creek, the station buildings, the platform and tank

at Beach City, and the removal of the existing track and bridges between the limits of the relocation. The steel superstructure and timber deck of the Sugar Creek bridge and an underpass for State Highway Route 21 are not included in the present contract. The railroad company will furnish for the track work, rail, miscellaneous bars and plates, anchors, switches, etc., f.o.b. nearest siding. The project is financed through PWA funds, is scheduled for 365 days' completion, with minimum prevailing wage rates of $1.50 for skilled and 50c. for common labor.

The following tabulation lists the unit bids of the three low bidders together with six alternates as indicated. Maj. J. D. Arthur, Jr., is District Engineer. A—The Cable Co., Canton, O. (contract), $336,521; B—Richard Peterson, Omaha, Neb., $343,188; C—Newhall Herkner Const. Co. and Peter Herkner, Cleveland, O., $348,729.

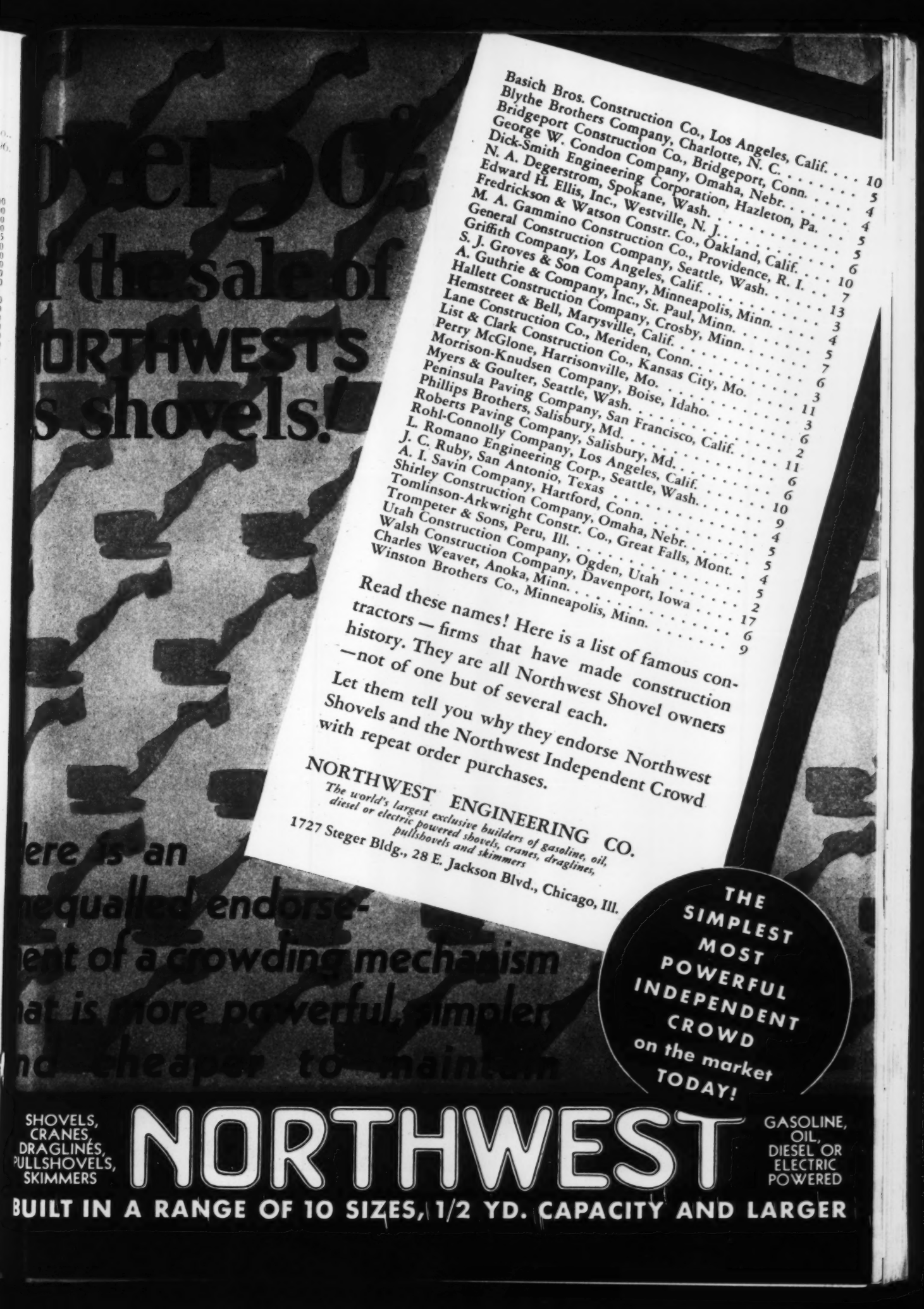
	A	B	C
1. Clearing and grubbing—18 acre	$40.00	$100.00	$40.00
2. Grading, excavation, unclassified—385,000 cu.yd	.21	.305	.29
3. Grading, borrow, unclassified—115,000 cu.yd	.20	.225	.25
4. Overhaul (over 3,000 ft.)—720,000 cu.yd	.01	.013	.01
5. Foundation excav. general—2,000 cu.yd	.60	.75	1.00
6. Foundation excav. below El. 930—800 cu.yd.	4.00	5.00	4.00
7. Foundation piles—10,000 lin.ft.	.50	.50	.60
8. Concrete, class A—1,250 cu.yd.	15.00	12.00	15.00
9. Concrete, class B—900 cu.yd.	12.00	11.50	12.00
10. Drill holes, rock or concrete—65 lin.ft.	1.00	1.00	1.00
11. Furnish, place, reinforcing steel—205,000 lb	.04	.036	.046
12. Furnish, place structural steel—700 lb	.06	.05	.07
13. Cast-iron pipe culverts—20 ton	70.00	65.00	72.00
14. Vitrified pipe drains, 6in.—200 lin.ft	.30	.50	1.00
15. Vitrified pipe drains, 12in.—400 lin.ft.	.60	1.00	1.50
16. Vitrified pipe drains, 18in.—200 lin.ft.	.90	2.00	2.50
17. Riprap—260 cu.yd	6.00	3.00	6.00
18. Completed railroad main track—26,800 lin.ft.	4.57	3.20	3.35
19. Completed railroad sidetrack—6,800 lin.ft.	2.75	2.90	2.85
20. Completed No. 10 turnouts—4 each	300.00	375.00	725.00
21. Road grade crossings—150 sq.yd	1.50	3.00	3.50
22. Grade crossing approach surfacing—1,425 sq.yd	1.00	1.30	1.30
23. Move & reset roadway signs—total	110.00	110.00	90.00
24. Completed station building & platform—total	6,000.00	6,000.00	5,800.00
25. Station driveway surfacing—3,000 sq.yd	1.00	1.10	1.05
26. Move (3) small buildings—total	150.00	150.00	200.00
27. Complete water tank—total	2,500.00	4,500.00	4,400.00
28. Cast-iron water line, 3in.—1,275 lin.ft.	1.55	1.10	1.70
29. Wrought-iron water line, 1in.—125 lin.ft.	.45	.70	1.00
30. Complete stock pens—total	385.00	200.00	375.00
31. Right-of-way fencing—2,300 rod	1.00	1.65	2.40
32. Right-of-way fence gates—10 each	10.00	15.00	11.00
33. Removal of railroad tracks—32,500 lin.ft.	.20	.20	.08
34. Removal of switch connections—4 each	80.00	75.00	60.00
35. Load cross ties, switch & bridge ties—4,000 each	.05	.06	.15
36. Removal of steel bridges—total	3,000.00	4,650.00	3,500.00
37. Removal of piers—total	1,500.00	1,750.00	2,500.00
38. Alternate on Item 24: Move & place existing Beach City station on proposed station site & completing platform—total	10,000.00	6,000.00	4,000.00
39. Alternate on Item 18: Completed railroad main track using crushed stone ballast in lieu of washed gravel specified—26,800 lin.ft.	5.90	4.20	4.50
40. Completed railroad main track using crushed slag ballast in lieu of washed gravel specified—26,800 lin.ft.	4.95	3.80	3.85
41. Alternate on Item 19: Completed railroad side track using crushed slag ballast in lieu of washed gravel specified—6,800 lin.ft.	3.00	3.40	3.20
42. Alternate on Item 20: Completed No. 10 turnouts with crushed stone ballast in lieu of washed gravel specified—4 each	350.00	500.00	900.00
43. Completed No. 10 turnouts, crushed slag ballast—4 each	333.00	450.00	800.00
44. Bid for the purchase of all timber and structural steel salvaged from bridges to be removed under this contract f.o.b. at point of loading	5,000.00	2,000.00	2,700.00

Fort Peck Dam Spillway Gate

CONTRACT was awarded April 4, 1935, for the construction of the spillway gate structure and appurtenant works at Fort Peck Dam. The work, financed through PWA funds, attracted four bids ranging from a low of $3,985,423 to a high of $5,147,796. The following tabulations give the quantities involved, the unit prices of the successful bidder and the totals for the four contractors submitting bids. Maj. T. B. Larkin, U. S. District Engineer, is in charge. Fielding & Shepley, Inc., and Addison Miller, Inc., St. Paul, Minn. (contract), $3,985,423; Spillway Builders, Inc., Kansas City, Mo., $4,387,426; G. L. Tarlton, Inc., and Frazier-Davis Const. Co., St. Louis, Mo., $4,779,145; Six Companies, Inc., San Francisco, $5,147,796.

CONTRACT PRICES, FT., PUCK SPILLWAY GATES

1. Open cut excavation—516,000 cu.yd	$1.00
2. Trench excavation, 0 to 10 ft.—29,000 cu.yd	5.00
3. Trench excavation, 10 to 30 ft.—30,500 cu.yd	5.00
4. Trench excavation, 30 to 50 ft.—25,000 cu.yd	3.20
5. Trench excavation, 50 to 75 ft.—18,000 cu.yd	3.25
6. Trench excavation, 75 to 100 ft.—14,000 cu.yd	3.30
7. Trench excavation, 100 to 125 ft.—9,000 cu.yd	3.50
8. Trench excavation, 125 to 150 ft.—1,200 cu.yd	3.90
9. Trench excavation, over 150 ft.—200 cu.yd	4.90
10. Excavation for building—300 cu.yd	2.00
11. Excavate for fdt. piles with rotary drill, 5 ft. dia., 0 to 30 ft.—7,700 lin.ft.	5.80
12. As Item 11, 30 to 40 ft.—3,000 lin.ft	6.00
13. As Item 11, 6 ft. dia. 0 to 40 ft.—5,000 lin.ft.	6.50
14. As Item 13, 40 to 70 ft.—3,000 lin.ft	7.00
15. Enlarge drill holes for fdt. piles—5,000 cu.yd	3.00
16. Apply liquid sealing solution (3 coats)—16,000 squares	1.50
17. Apply bituminous spray waterproofing solution (one coat)—700 squares	1.00
18. Vitrified clay pipe drains, 18 in.—1,000 lin.ft	2.00
19. Vitrified clay pipe drains, 12 in.—4,200 lin.ft	1.00
20. Vitrified clay pipe drains, 8 in.—1,000 lin.ft.	0.65
21. Vitrified clay pipe drains, 6 in.—2,900 lin.ft	0.49
22. Backfill—40,000 cu.yd	0.75
23. Gravel fill—20,000 cu.yd	0.75
24. Riprap paving—6,000 cu.yd	2.00
25. Furnish & place steel sealing strips—231,000 lb	0.06
26. Furnish & place joint filler—3,500 sq.ft.	0.30
27. Caulk joints—30,000 lin.ft.	0.15
28. Concrete for slabs—84,720 cu.yd	1.85
29. Concrete for piers & ret. walls—53,000 cu.yd.	3.85
30. Concrete for gate structure abutment walls—22,400 cu.yd	6.85
31. Concrete for foundation piles—13,640 cu.yd.	1.75
32. Concrete for approach channel sidewalls—8,600 cu.yd	4.00
33. Concrete for highway bridge—4,220 cu.yd	15.25
34. Concrete for bridge abut. & ret. walls—8,540 cu.yd	8.00
35. Concrete for parapet walls—1,800 cu.yd.	7.00
36. Concrete for cut-off structure—89,600 cu.yd.	1.75
37. Concrete for counterweights—800 cu.yd.	9.00
38. Concrete for drainage structures—400 cu.yd.	3.00
39. Gunite coating—1,000 squares	4.90
40. Drill grout holes—5,000 lin.ft.	1.15
41. Furnish & install grout pipes & connections—5,000 lb	0.20
42. Grouting—100,000 cu.ft.	0.80
43. Struct. steel vertical lift gates—2,120,000 lb.	0.059
44. Furnish, place, remove struct. steel bracing (steel to belong to U. S.)—1,000,000 lb.	0.062
45. Furnish & place struct. steel bracing (steel left in place)—2,500,000 lb.	0.054
46. Structural steel ladders—16,500 lb	0.12
47. Struct. steel for service bridge—1,050,000 lb.	0.052
48. Bronze bearing plates for bridge—15,100 lb	0.40
49. Steel rail for service bridge—126,000 lb.	0.06
50. Misc. struct. steel—1,200,000 lb.	0.06
51. Misc. steel pipe—38,000 lb.	0.10
52. Pipe hand rails—46,000 lb.	0.15
53. Furnish, place, steel reinforcing bars—22,200,000 lb	0.039
54. Steel reinforcing fabric—10,000 lb.	0.08
55. Corrosion-resisting steel—104,000 lb.	0.40
56. Steel bolts, screws, washers—12,000 lb.	0.10
57. Steel castings—540,000 lb.	0.13
58. Cast nickel steel—3,000 lb.	0.25
59. Forged steel—500 lb	0.25
60. Sheet metal—25,000 lb.	0.15
61. Iron castings—60,000 lb	0.07
62. Hardware—5,000 lb.	0.75
63. Steel floor grating—130,000 lb.	0.11
64. Brass—500 lb.	1.00
65. Phosphor bronze—500 lb	1.00
66. Babbitt metal—50,000 lb.	0.2
67. Roller bearing wheels for vertical lift gates—352, each	310.00
68. Corrugated metal pipe, 18 in.—240 lin.ft.	2.50
69. Corrugated metal pipe, 24 in.—170 lin.ft.	3.40
70. Corrugated metal pipe, 36 in.—50 lin.ft.	6.90
71. Corrugated metal pipe, 48 in.—50 lin.ft.	11.50
72. Corrugated metal pipe, 60 in.—380 lin.ft.	20.00
73. Furnish, place, remove timber & bracing (timber to belong to U. S.)—100 M.f.b.m.	73.50
74. Furnish, place timber sheeting & bracing (timber left in place)—200 M.f.b.m.	67.50
75. Electrical conduit & fittings, ¾ in.—2,000 lin.ft.	0.27
76. Electrical conduit & fittings, ¾ in.—2,000 lin.ft.	0.34
77. Electrical conduit & fittings, 1 in.—1,200 lin.ft.	0.50
78. Electrical conduit & fittings, 1¼ in.—2,500 lin.ft.	0.67
79. Electrical conduit & fittings, 1½ in.—10,000 lin.ft.	0.81
80. Electrical conduit & fittings, 2 in.—1,000 lin.ft.	1.09
81. Electrical conduit & fittings, 2½ in.—1,000 lin.ft.	1.71
82. Electrical conduit & fittings, 3 in.—1,000 lin.ft.	2.25
83. Electrical conduit & fittings, 4 in.—1,000 lin.ft.	3.00
84. Electrical conduit & fittings, 5 in.—1,000 lin.ft.	4.43
85. Furnish & install conduit boxes—900, each	17.00
86. Heating system for gate seals—(total)	38,962.00
87. Concrete for buildings—750 cu.yd.	13.40
88. Furnished, place, reinf. bars for buildings—78,500 lb	0.051
89. Furnish, place, wire fabric for buildings—2,700 lb.	0.08
90. Operators' quarters, machine shop building, complete except for excavation, concrete & reinforcing steel (total)	23,800.00
91. Control tower, complete except for excavation, concrete & reinforcing steel—(total)	4,690.00
92. Relaying standard gauge railroad track—1,200 l.f. track	1.00
93. Construct standard gauge railroad track—4,465 l.f. track	5.10
94. Standard gauge railroad turnouts—540 l.f. turnout	10.00
95. Construct std. & wide gauge railroad track—1,000 l.f. track	10.00
96. Combination turnouts, std. & wide gauge—170 l.f. comb. turnout	20.00
97. Flooring timber for railroads—9.5 M.f.b.m	80.00
98. Place 12 in. gravel base for pavement—15,500 sq.yd.	0.235
99. Place 8-in. gravel base for pavement—19,000 sq.yd.	0.20
100. Place 3-in. gravel base for pavement—2,000 sq.yd.	0.142
101. Bitumen A applied in gravel base course—27,000 gal	0.30
102. Bituminous concrete base course, 2 in., in place—3,000 ton	8.50
103. Bituminous concrete top course, 1 in., in place—1,500 ton	10.00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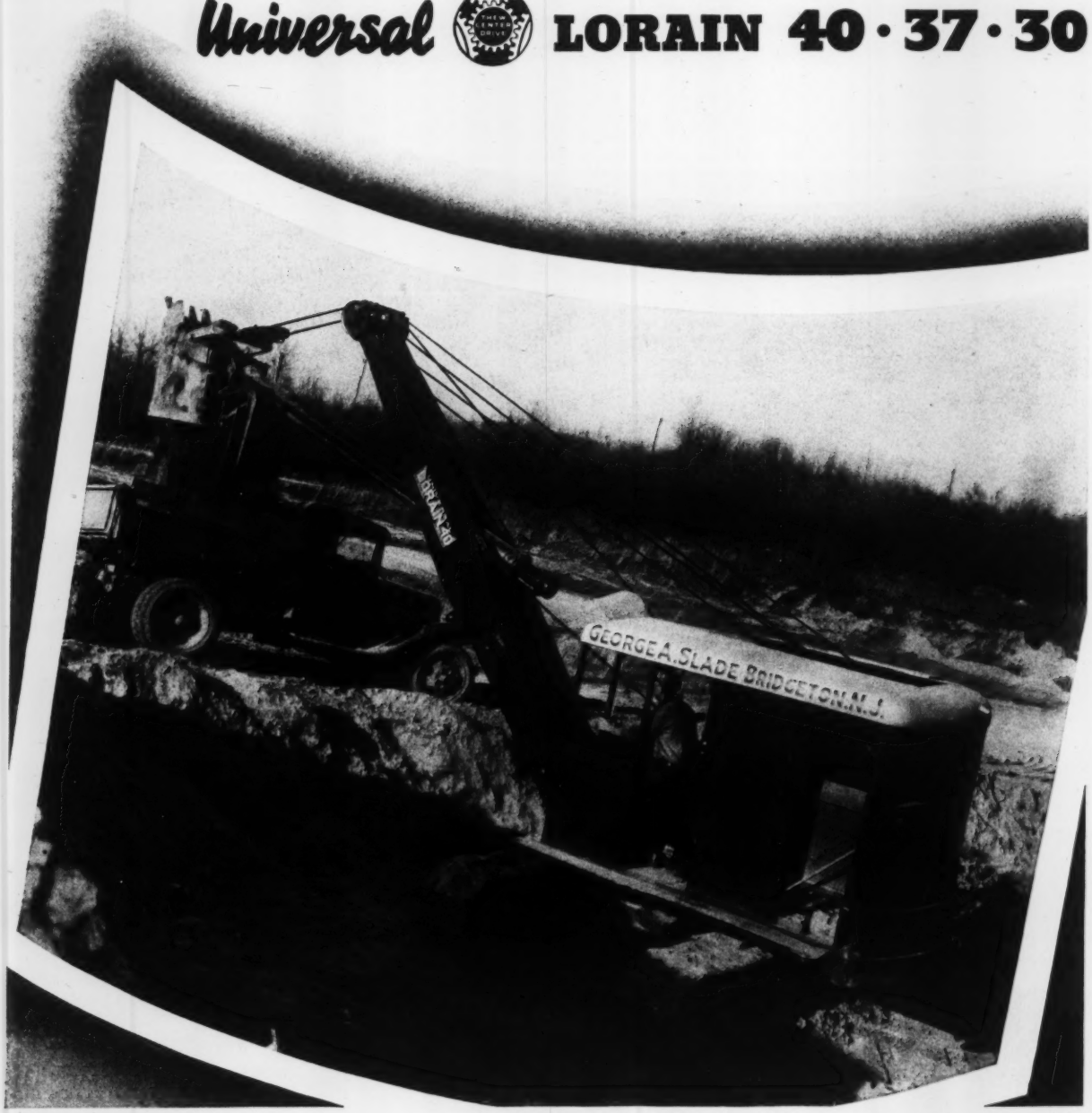
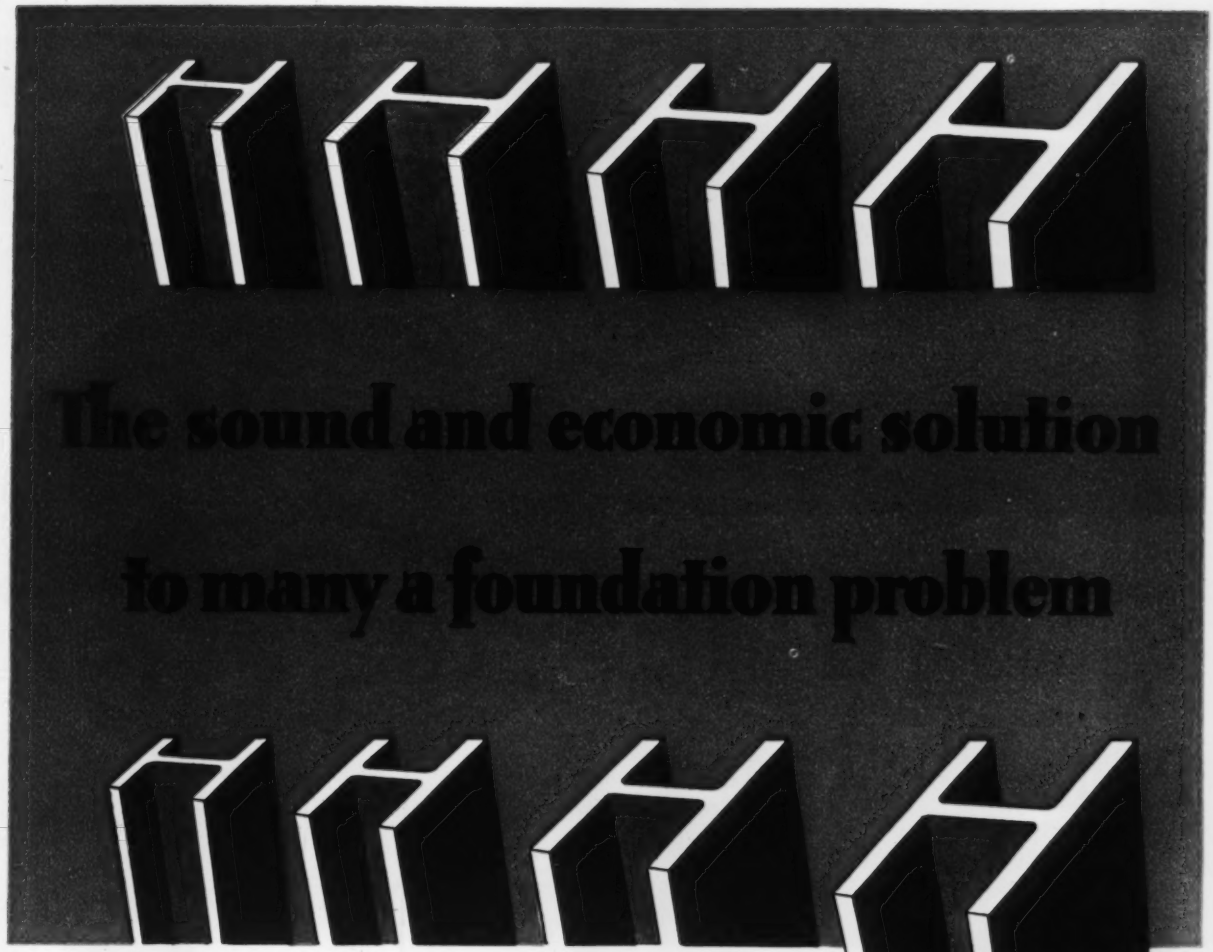
Bridgeport Construction Co., Bridgeport, Conn. 4
George W. Condon Company, Omaha, Nebr. 4
Dick-Smith Engineering Corporation, Hazleton, Pa. . . . 5
N. A. Degerstrom, Spokane, Wash. 5
Edward H. Ellis, Inc., Westville, N. J. 6
Fredrickson & Watson Constr. Co., Oakland, Calif. . . . 10
M. A. Gammino Construction Co., Providence, R. I. . . . 7
General Construction Company, Seattle, Wash. 13
Griffith Company, Los Angeles, Calif. 3
S. J. Groves & Son Company, Minneapolis, Minn. 4
A. Guthrie & Company, Inc., St. Paul, Minn. 5
Hallett Construction Company, Crosby, Minn. 7
Hemstreet & Bell, Marysville, Calif. 6
Lane Construction Co., Meriden, Conn. 3
List & Clark Construction Co., Kansas City, Mo. 11
Perry McGlone, Harrisonville, Mo. 3
Morrison-Knudsen Company, Boise, Idaho. 6
Myers & Goulter, Seattle, Wash. 2
Peninsula Paving Company, San Francisco, Calif. . . . 11
Phillips Brothers, Salisbury, Md. 6
Roberts Paving Company, Salisbury, Md. 6
Rohl-Connolly Company, Los Angeles, Calif. 10
L. Romano Engineering Corp., Seattle, Wash. 9
J. C. Ruby, San Antonio, Texas 4
A. I. Savin Company, Hartford, Conn. 5
Shirley Construction Company, Omaha, Nebr. 4
Tomlinson-Arkwright Constr. Co., Great Falls, Mont. . . 5
Trompeter & Sons, Peru, Ill. 5
Utah Construction Company, Ogden, Utah 2
Walsh Construction Company, Davenport, Iowa 17
Charles Weaver, Anoka, Minn. 6
Winston Brothers Co., Minneapolis, Minn. 9
Read these names! Here is a list of famous contractors — firms that have made construction history. They are all Northwest Shovel owners —not of one but of several each.
Let them tell you why they endorse Northwest Shovels and the Northwest Independent Crowd with repeat order purchases.
NORTHWEST ENGINEERING CO.
The world's largest exclusive builders of gasoline, oil, diesel or electric powered shovels, cranes, draglines, pullshovels and skimmers
1727 Steger Bldg., 28 E. Jackson Blvd., Chicago, Ill.
THE SIMPLEST MOST POWERFUL INDEPENDENT CROWD on the market TODAY!
SHOVELS, CRANES, DRAGLINES, PULLSHOVELS, SKIMMERS
NORTHWEST
GASOLINE, OIL, DIESEL OR ELECTRIC POWERED
BUILT IN A RANGE OF 10 SIZES, 1/2 YD. CAPACITY AND LARGER

Something You Should Know . . .

Whether or not you're in the market just now for a ¾—⅝—½ yd. shovel, you should, to keep abreast of these fast-moving times, post yourself on how to move more dirt, faster and cheaper. . . . That's why you should have bulletins describing the Lorain 40-37-30's on file—particularly the L-40, a unit, weighing but little more than a ½ yd. unit, which has demonstrated the value of modern, simple, rugged and efficient Center Drive design by its ability to handle a ¾ yd. dipper to the complete satisfaction of an ever-growing list of owners. Write today to The Universal Crane Co., Lorain, Ohio.

Universal **LORAIN 40 · 37 · 30**





The sound and economic solution to many a foundation problem

THE rolling of steel H-sections, pioneered by Bethlehem Steel Company in 1908, placed in the hands of construction engineers a new type of bearing pile of enormous possibilities.

The ability of steel H-piling to stand up under hard, continuous driving when conditions require considerable penetration in hard ground materials, and its consequent great load-carrying capacity, and other advantages, led to its extensive use. Today steel H-piling is recognized as offering the sound and economic solution to many foundation problems —for bridges, piers, buildings, industrial plants and other structures.

Bethlehem Steel H-Piling is rolled in a complete range of weights and sizes, including a group of newly-designed sections which further broaden its usefulness to the construction engineer.

KALMAN STEEL CORPORATION, *Subsidiary of Bethlehem Steel Corporation. General Offices: Bethlehem, Pa. District Offices:* Albany, Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Houston, Milwaukee, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, St. Paul, Syracuse, Washington. **Pacific Coast Distributor: PACIFIC COAST STEEL CORPORATION,** San Francisco, Los Angeles, Seattle, Portland, Honolulu. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

BETHLEHEM STEEL

BETHLEHEM Steel H-PILING

One of Vermilion County's first 10-foot pavements as it looks today—in excellent condition after 18 years.

Burning of paid-up county road bonds celebrated with mile-long parade at Danville.

Vermilion County proves that

the real low cost county roads are CONCRETE

Burns paid-up bonds at celebration. 18-year-old pavements good for as many years more.

In 1915, Vermilion County, Illinois, issued bonds and pioneered the first county-wide concrete road system.

On June 5, this year, thousands of its citizens staged a jubilee at Danville to burn the bonds, now paid up, and hand the roads down to the next generation.

A stock-taking in Vermilion County shows—

1. The original 145 miles of 10-foot concrete, after 18 years, are in good condition and should give as many more years of good service.

2. People have been well satisfied with their single-lane pavements. They have found them safe and adequate for their needs. Many miles have been added during the past 5 years. Today the county has approximately 250 miles of 10-foot pavement on farm-to-market routes. About 50 miles have been widened to 18 feet.

3. The county is saving thousands of dollars annually because of concrete's low surface maintenance cost.

4. Farmers and city motorists save upwards of one-half a million dollars a year in gas, tires, car repairs and car depreciation by driving on concrete instead of low type roads.

5. Enduring community wealth has been created at a cost which at no time was burdensome.

For every county road there is an economical concrete pavement design. Your concrete program is an *economy* program. The facts about it will interest every motorist and taxpayer.

The complete story of Vermilion County will be sent free on request.

PORTLAND CEMENT ASSOCIATION
Room 864, 33 W. Grand Ave., Chicago, Ill.

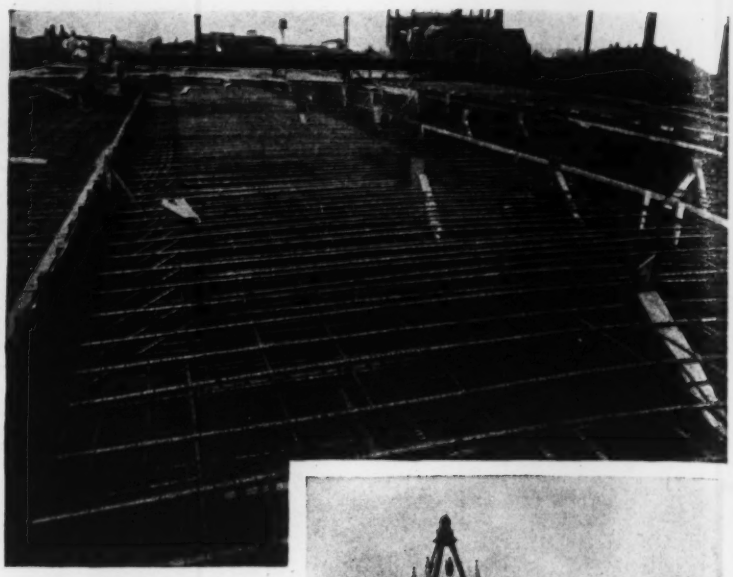
You'll find *everything* in

REPUBLIC

ELECTRIC WELD

CASING • TUBING

SERVICE on Inland Reinforcing Bars Is COMPLETE



Inland Reinforcing Bars in huge viaduct over the Chicago River, Goose Island, tracks and streets —Ogden Avenue, Chicago

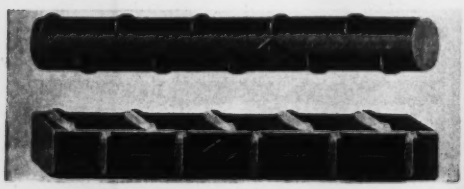
Bars furnished cut to length, bent, bundled and tagged .... also spirals, spacers, engineering service. Thus, Inland supplies the material ready for immediate use.

DEPENDABLE...

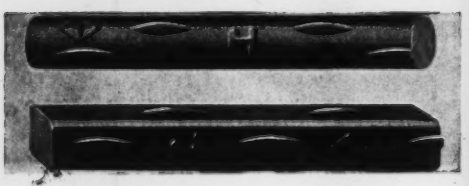
More than 40 years' experience, ample fabricating equipment and large stocks in all sizes, assure prompt and efficient service. Inland Reinforcing Bars are sold direct from our own stock and through distributors.

● World's largest reinforced concrete building — Furniture Mart, Chicago. All Inland Reinforcing Bars used.

● *Below:* World's largest building — Merchandise Mart, Chicago. All concrete was reinforced with Inland Bars



BILLET STEEL BARS — Spec. ASTM-A15-34



RAIL STEEL BARS — Spec. ASTM-A16-34

INLAND STEEL

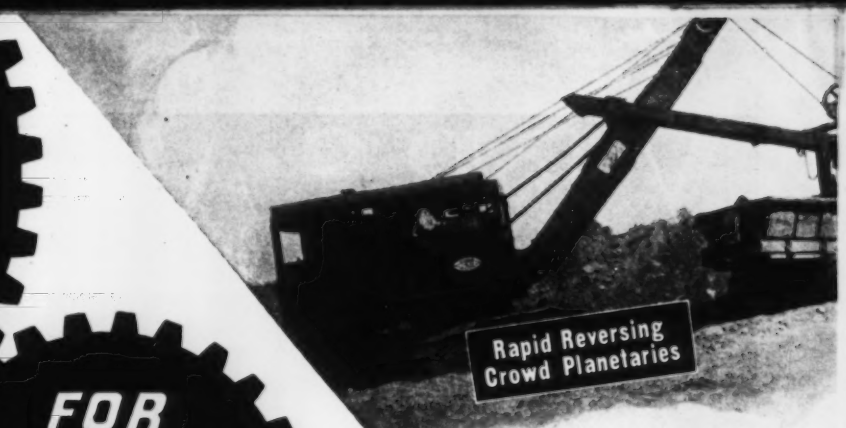
Sheets Strip Tin Plate
Plates Structurals Piling

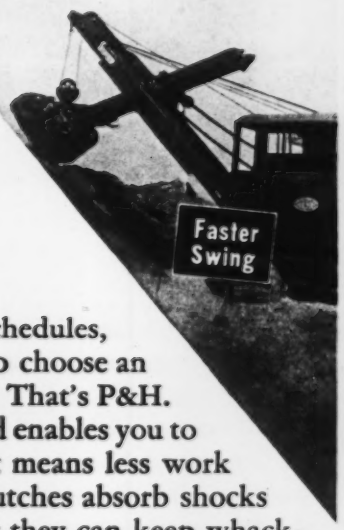
Rails Track Accessories
Bars Rivets Billets

38 South Dearborn Street, Chicago, Illinois

P&H

HIGH GEAR PRODUCTION FOR LOW COST ROADS





Road contracts this year call for heavy work, fast schedules, and low cost production . . . That's why you'll want to choose an excavator which is *geared to the job* of road building. That's P&H. *HERE'S WHY:* . . . The durable P&H chain crowd enables you to dig at top speeds within 1 inch of grade. That means less work on the clean up. P&H "Sure Feel" power clutches absorb shocks that punish other excavators. That's why they can keep whacking away day after day with less time out for layup. P&H rapid reversing crowd planetaries give you faster crowd-out-crowd-in . . . they're easier to operate. And the super smooth swing clutches give you more accurate spotting with less time between bites. Remember, the swing represents 60% of the digging cycle. That means a heap more yards per day! . . You can get business and make money with P&H performance. Begin by investigating these features that give you modern, high speed production. They'll put you in the low bid brackets on any kind of road work. Write for bulletins.

P&H BANTAM WEIGHT (MODEL 100 ⅜-YD.

The new, small shovel that does big things Lighter, faster, huskier — with all-welded construction. Powered by the smooth Ford V-8 motor. Fully convertible at the lowest cost ever. If you haven't a copy of Bulletin No. 100, write for it today.

HARNISCHFEGER CORPORATION

4404 W. NATIONAL AVE. *Established 1884* MILWAUKEE, WIS.

Warehouses and Service Stations: Hoboken — Memphis — Jacksonville — Seattle — Dallas — Los Angeles — San Francisco

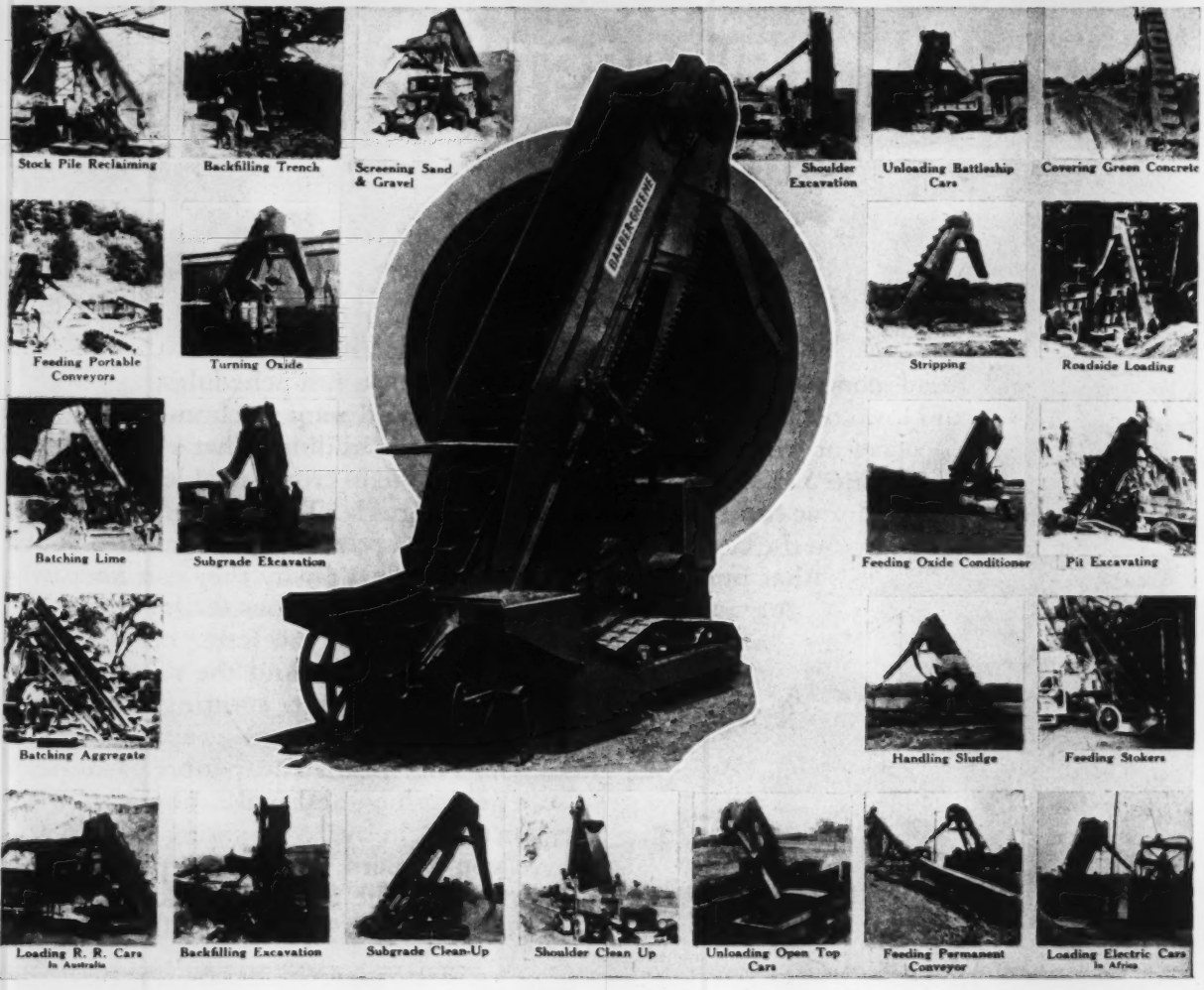
P&H EXCAVATORS FOR ROAD BUILDING

MODEL 100 ⅜ YD. — MODEL 400 ¾ YD. — MODEL 600 1 YD. — MODEL 650 1¼ YD.

AND UP TO 4 CU. YARDS

VERSATILITY

The Barber-Greene Model 82 Bucket Loader is the result of designing loaders for all these applications



NO WONDER our sales have jumped with the announcement of the New B-G 82 Loader. The above photos show a part of the B-G "proving grounds" — stretching from Africa to Australia. These are just 24 of the TWO THOUSAND B-G Bucket Loaders that have been sold.

B-G History includes the announcement of the first Loader with self feeding—first with automotive engine—first with truck type transmission—first and only with the Automatic Overload Release—first and only with the Floating Boom. The 82 makes the biggest step of all—in addition to the above features it has—SYNCHRONIZED FEEDING . . . . SLOW CROWDING . . . . KNEE ACTION . . . . TANK TYPE CHASSIS FRAME . . . . WELDED BUCKETS . . . . HARD FACING ON BUCKET LIPS . . . QUICK ACTING SELF-LOCKING SWIVEL SPOUT . . . . and many other valuable new developments. Capacity? Two to Three yards per minute (clocked at four). Price? You'll have one as soon as you hear it. Write for complete information. No obligation.

35-16

Standardized Material Handling Machines

BARBER GREENE

422 W. Park Ave.
Aurora, Illinois

As tight as new
...after 120 years constant service

London laid this pipe before Wellington's victory at Waterloo

THIS cast iron main, part of the water distribution system of London, England, has been in constant service for more than 120 years. It was laid between 1810 and 1812, before Wellington met Napoleon at Waterloo. Officials of the Metropolitan Water Board recently uncovered this gallant old main and on inspection it was found "as tight as new." It will be noted that the joints are of the bell-and-spigot type, standard today in water works construction.

The economies resulting from the long life of cast iron pipe are due to its effective resistance to rust. Cast iron is the one ferrous metal for water and gas mains, and for sewer construction, that will not disintegrate from rust. This characteristic makes cast iron pipe the most practicable for underground mains since rust will not destroy it.

For further information, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago, Illinois.

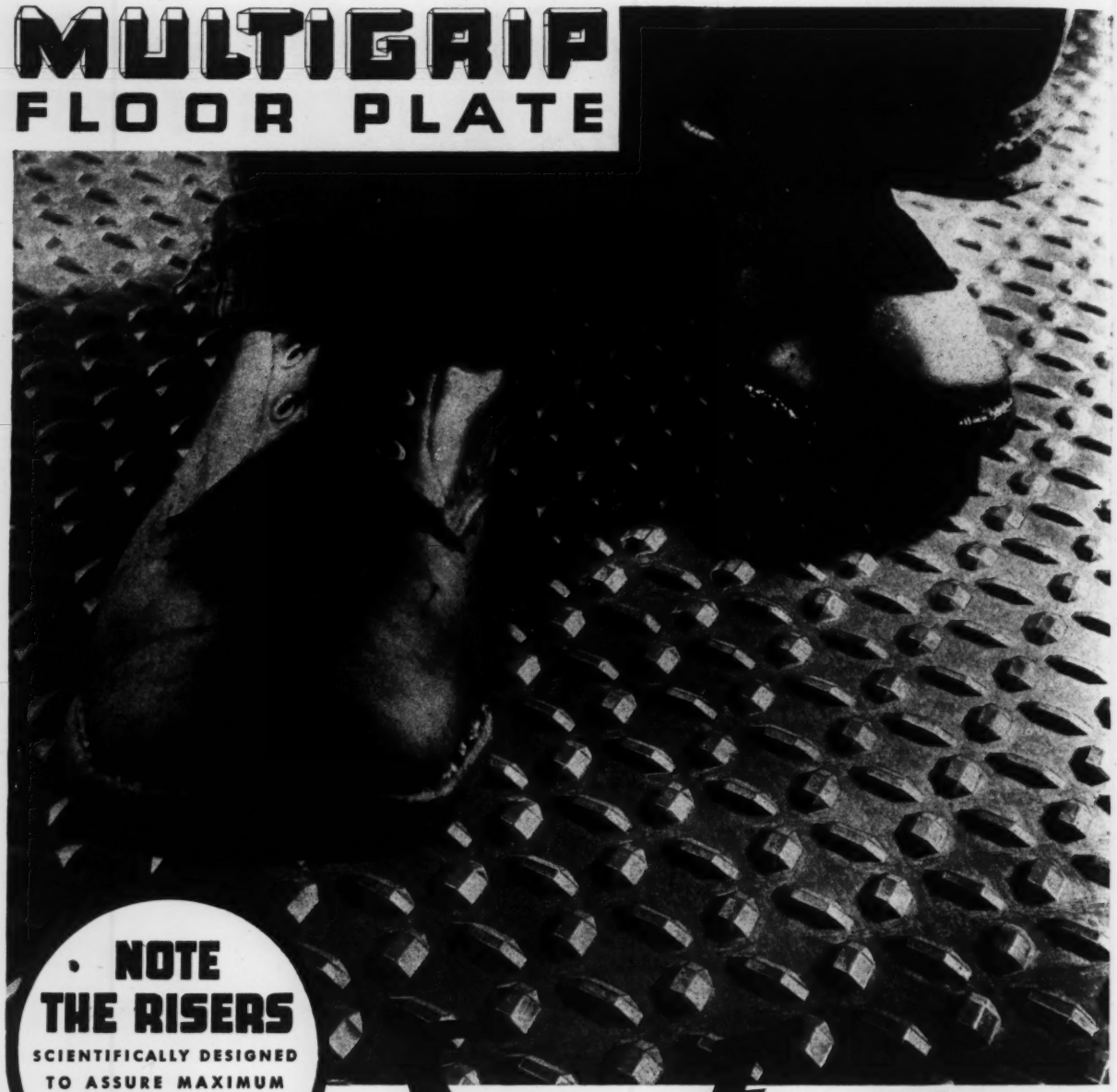
4 Reasons Why Water Works Improvements Are Preferred P.W.A. Projects

1. Approximately 75% of the cost of manufacturing, distributing and installing cast iron pipe, including raw materials, goes directly to workmen.
2. Manufacturing and installing one mile of 6-inch cast iron pipe main gives approximately 1000 man days of employment.
3. For every 100 tons of cast iron pipe manufactured, the railroads handle approximately 1000 tons of raw materials.
4. The direct and indirect employment of thousands of workmen in connection with this type of construction means a wide distribution of wages.

CAST IRON PIPE

METHODS OF EVALUATING BIDS NOW IN USE BY ENGINEERS RATE THE USEFUL LIFE OF CAST IRON PIPE AT 100 YEARS

MULTIGRIP
FLOOR PLATE



• NOTE THE RISERS
SCIENTIFICALLY DESIGNED TO ASSURE MAXIMUM SKID RESISTANCE AT EVERY ANGLE •

Sure footing
PLUS
READY DRAINAGE • EASY CLEANING
COMFORT UNDER FOOT • ECONOMICAL
CUTTING • ATTRACTIVE APPEARANCE • AND
OTHER FEATURES FULLY DESCRIBED IN OUR PAMPHLET

ILLINOIS STEEL COMPANY
208 SOUTH LA SALLE STREET, CHICAGO, ILLINOIS

United States Steel Corporation Subsidiary

OUTSTANDING PERFORMANCE WITH NEW HOMO-FLEX CONSTRUCTION

Condor CONVEYOR BELT

USED ON THE T. V. A. PROJECT

For economical handling and conveying of materials, Condor Conveyor Belts with new Homo-Flex Construction have run up enviable tonnage records. On the T. V. A. Project, Condor Conveyor Belts are used . . . Whether it is a long or short haul, high or low lift, heavy, light, dry or wet material, in hot or cold state, Manhattan assumes responsibility for the economical and efficient handling of materials with a Condor Conveyor Belt if the operating conditions are first given us. Our more than 40 years' experience backs this assurance. . . . Our new Homo-Flex Construction provides a homogeneous rubber and fabric structure new to conveyor belts and eliminates the tendency for belts to puncture, separate in cover or plies, stretch or fail because of small pulleys.

Advantages of Homo-Flex Construction

1. Extreme flexibility — troughs perfectly, even in thick ply and long narrow belts.
2. Reduces stretch to a new minimum
3. Gives longer belt life due to complete bonding of every member in the belt into a homogeneous structure.
4. Inseparable wear-resisting covers.
5. Resists puncture to an amazing degree.

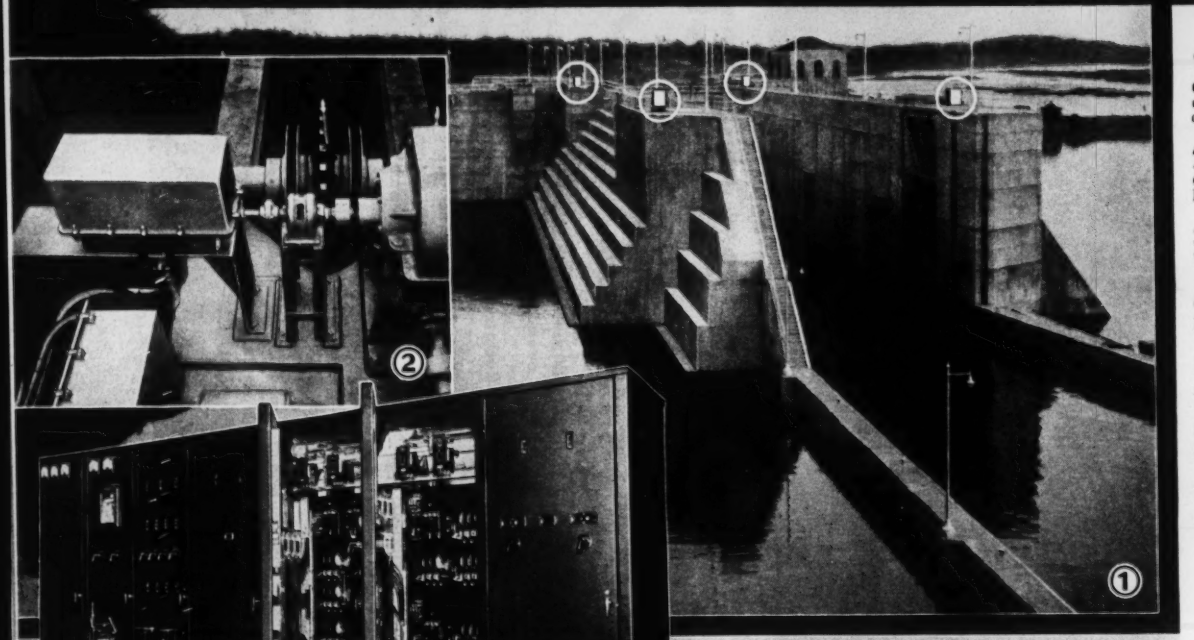
THE MANHATTAN RUBBER MFG. DIVISION

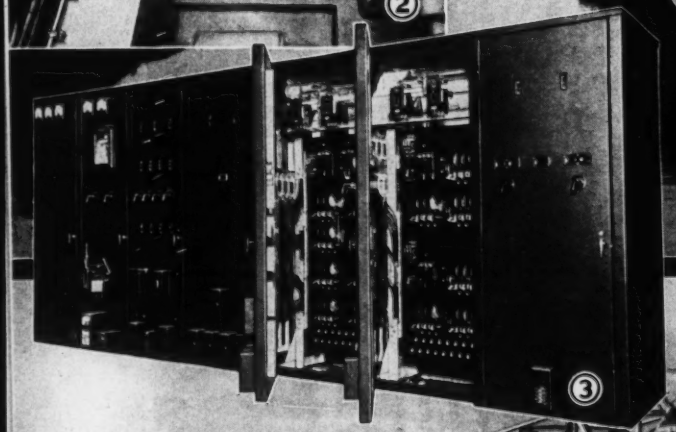
OF RAYBESTOS-MANHATTAN, INC.

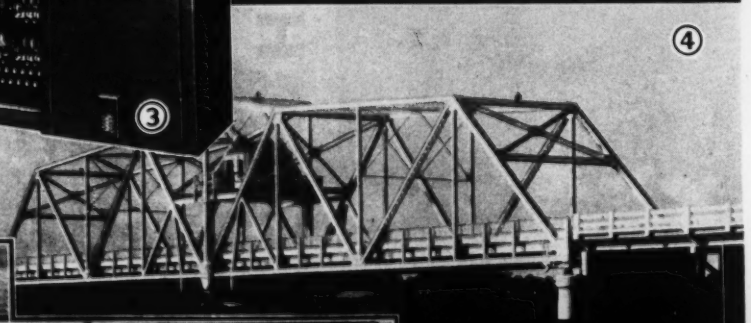
EXECUTIVE OFFICES and FACTORIES: 92 TOWNSEND ST., PASSAIC, N. J.

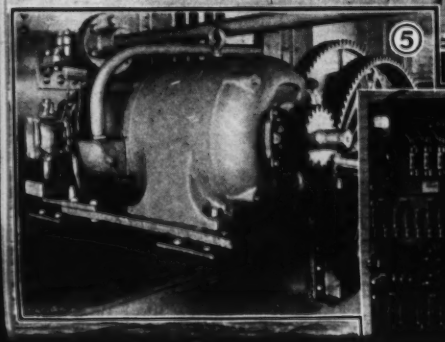
MORE AND MORE AND MORE

...C-H GETS THE VOTE ON THE CONTROL OF DAMS, LOCKS, BRIDGES AND SEWAGE AND PUMPING PROJECTS









1 Gen'l Joe Wheeler Lock and Dam, Tennessee River: C-H Control in the four encircled Control Stands on top of lock wall.

2 C-H Limit Switch on Valve Operating Machinery, Gen'l Joe Wheeler Lock and Dam.

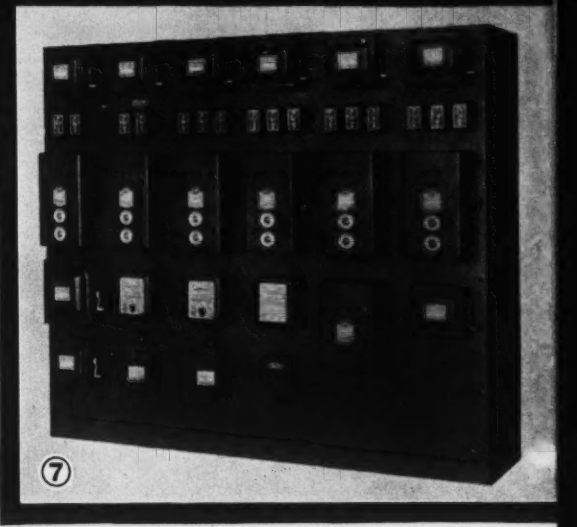
3 C-H Control Board in Control House, Gen'l Joe Wheeler Lock and Dam.

4 Santa Rosa Bridge, Camp Walton, Florida: C-H Bridge Control used.

5 Machinery room, Santa Rosa Bridge: C-H Brake at rear of main motor.

6 C-H Bench Master and Control Panel, Santa Rosa Bridge.

7 C-H Control on Switchboard in Flora, Illinois, Sewage Disposal Plant.



SPECIALIZED experience, proven performance—MOTOR CONTROL LEADERSHIP—these explain the mounting preference for Cutler-Hammer Control on locks, dams, lift bridges, water pumping and sewage disposal plants. Whether the problem is to turn a valve automatically or to swing the gates of a huge lock, Cutler-Hammer can control the operation satisfactorily, and all the resources of C-H are at the disposal of the Engineers and Officials concerned with that project. You are invited to call upon C-H at any point from drafting-table to installation. Address all inquiries to CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus,* 1261 St. Paul Ave., Milwaukee, Wis.

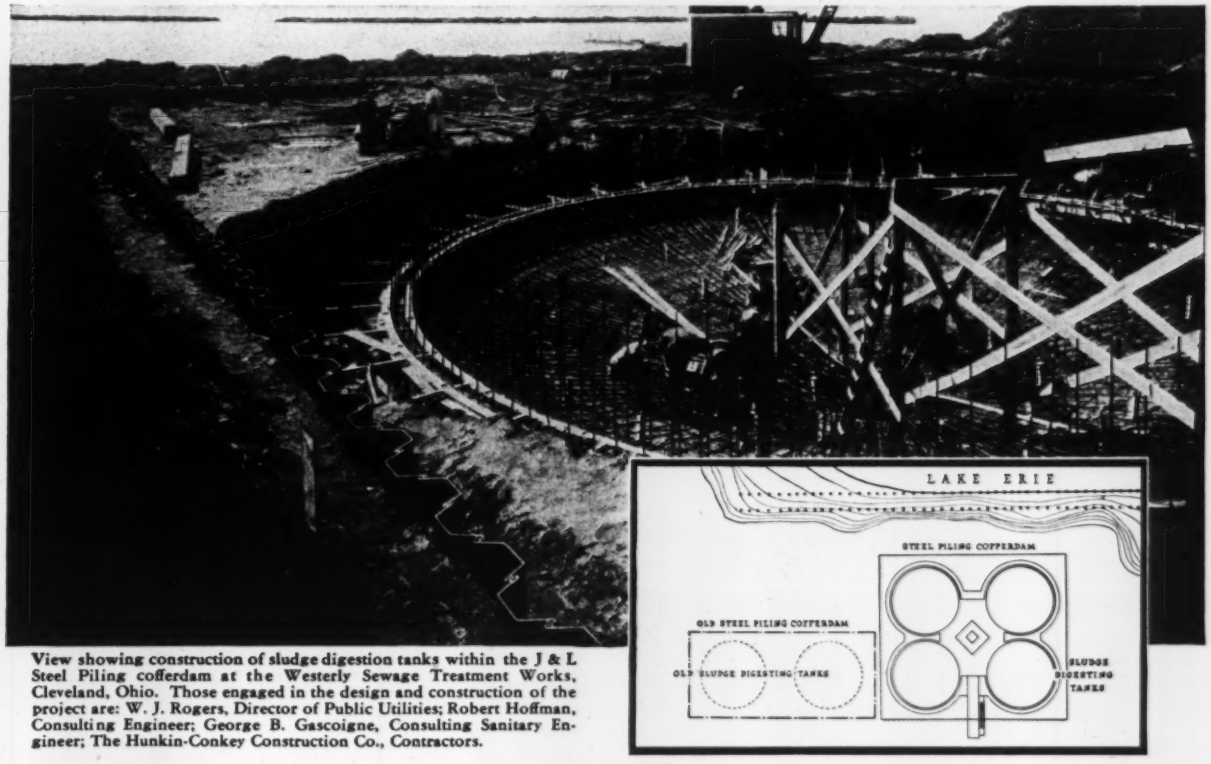
CUTLER HAMMER

STARTS, STOPS, REGULATES, PROTECTS INDUSTRY'S MOTORS

J&L STEEL PILING COFFERDAM PROTECTS SEWAGE TREATMENT TANKS ON LAKE SHORE

Construction of four new sludge digestion tanks at the Westerly Sewage Treatment Works, Cleveland, Ohio, within a few feet of the Lake Erie shore line, required the driving of a permanent steel piling cofferdam measuring approximately 122' by 136'. J & L Steel Piling Section DC-25, in lengths of 25 feet, was selected for this work. The effective water tightness of this cofferdam has enabled the contractor to carry the excavation below the lake level and to pour the concrete tanks without hindrance of excess water. The exceptional durability of the J & L Steel Piling provides a permanent protective wall around the structures.

J & L Steel Piling sections meet every demand for strength, economy and durability in all kinds of steel piling projects. The Jones & Laughlin Steel Corporation maintains a special engineering staff and invites inquiries on all types of steel piling projects, which will be analyzed promptly and reported upon in detail. Send for J & L Steel Piling Bulletin D; no obligation.



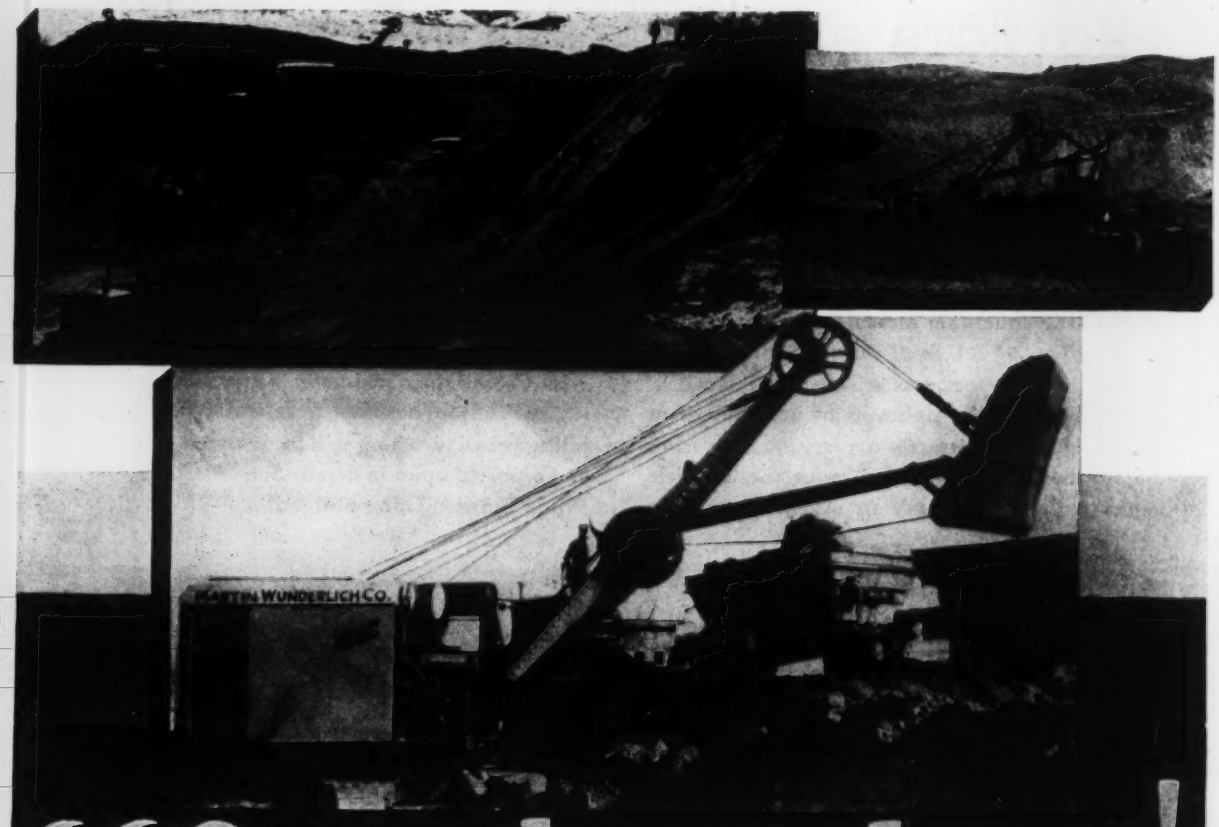
View showing construction of sludge digestion tanks within the J & L Steel Piling cofferdam at the Westerly Sewage Treatment Works, Cleveland, Ohio. Those engaged in the design and construction of the project are: W. J. Rogers, Director of Public Utilities; Robert Hoffman, Consulting Engineer; George B. Gascoigne, Consulting Sanitary Engineer; The Hunkin-Conkey Construction Co., Contractors.

OTHER J&L PRODUCTS

LIGHT WEIGHT ROLLED CHANNELS JUNIOR BEAMS STANDARD STRUCTURAL SHAPES
BARS FOR CONCRETE REINFORCEMENT ASSEMBLED ROAD BAR MATS STEEL PIPE
FABRICATED STRUCTURAL WORK Including Steel Plate Construction

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA
Sales Offices: Atlanta Boston Buffalo Chicago Cincinnati Cleveland Dallas Denver Detroit Erie Los Angeles Memphis Milwaukee Minneapolis New Orleans New York Philadelphia Pittsburgh St. Louis San Francisco
Warehouses: CHICAGO CINCINNATI DETROIT MEMPHIS NEW ORLEANS PITTSBURGH
Canadian Representatives: JONES & LAUGHLIN STEEL PRODUCTS COMPANY, Pittsburgh, Pa., U. S. A., and Toronto, Ont., Canada



660 yards per hour!

On the three million yard excavation for the spillway of the Fort Peck Dam, four Lorain 1½ yard shovels each moved 165 yards per hour of earth and fairly hard shale during the first month — an hourly total of 660 yards. These shovels are all equipped with AMSCO Manganese Steel Renewable Lip Dippers, which helped to establish this splendid performance.

AMSCO Renewable Lip Dippers (U.S. Patent No. 1,945,064) cut digging costs! The thin cutter edge lip, correct placement of dipper teeth at the lip corners, smooth dipper interior and correct body taper make for faster, easier filling and instantaneous dumping.

Lips are quickly and easily changed in the field—no trouble—no delay. Simply knock out four keys, loosen two U-bolts and the lip is off! No rivets to punch out or renew!

Furnished with double wall lip and teeth for hard digging and rock handling; single wall cutter type lip and teeth for loose material digging, stock piling and rehandling; and a thin, serrated edge cutter lip for mucking and clay digging; in all sizes from ¾ yard up. Without separate lips in ⅜, ½ and ⅝ yard sizes. Made with or without bail and with back lugs to fit any shovel.

Don't repair your old, worn dippers! Get the facts on the new AMSCO Renewable Lip Dipper. They'll save you time and money. Write your shovel manufacturer or our nearest office for complete details!

AMERICAN MANGANESE STEEL COMPANY

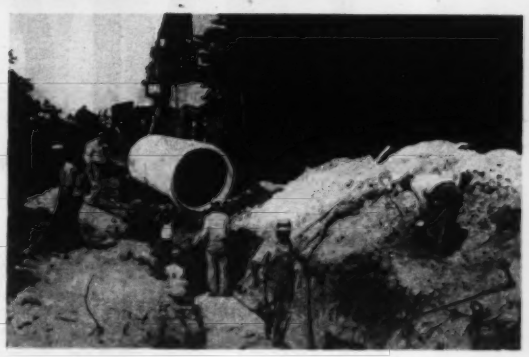
Division of American Brake Shoe & Foundry Company

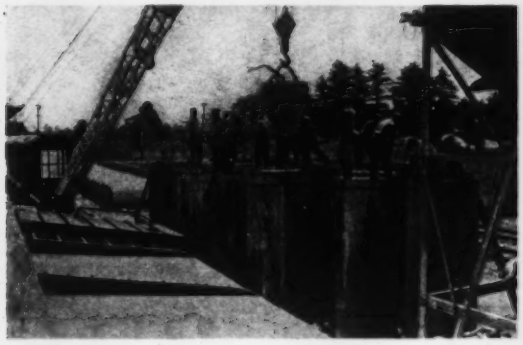
379 East 14th Street, Chicago Heights, Ill.

Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif.
Offices in Principal Cities

AMSCO

TRADE MARK REGISTERED





Local Labor is Used to Lay the Pipe

and

Local Labor and Local Materials Can Be Used to Make the Pipe

$4,880,000,000 for Public Works

WATER works or sewage projects involving large quantities of pipe can be planned to provide the maximum direct job labor by using Lock Joint Reinforced Concrete Pipe. In addition to using local forces to lay the pipe, we can also manufacture the pipe right in your own community, using local labor and local materials.

We stand ready to help you carry out your project to meet the President's request that all Public Works Funds be expended to provide for maximum direct job labor.

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

PRESSURE SUBAQUEOUS

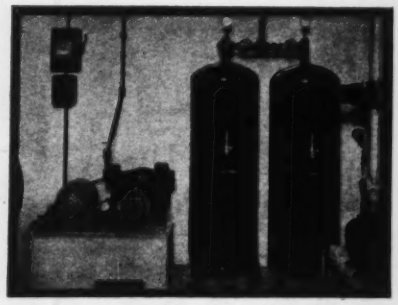
SEWER CULVERT

LOCK JOINT PIPE COMPANY

Established 1905

AMPERE, N. J.

BIG and little ones



have this one thing in common

ALL COMPRESSORS lose efficiency, entail excessive maintenance and repair expense, develop fire and explosion hazards, if the lubricants used are not specifically right for their particular service conditions.

It's easy and inexpensive to avoid such hazards. Among the lubricants Texaco recommends for air compressors, there is one that is specifically right for your units. In addition, Texaco places at your disposal a technical service to help your operators. This aids them to select oils that will meet your requirements efficiently — economically.

For every type of unit

NO MATTER WHAT TYPE OF UNIT you operate, Texaco *tested* Lubricants are dependable and efficient.

In mining operations, on construction jobs, in the newest type of vertical units and small portable compressors, Texaco Cetus, Texaco Alcaid, Texaco Algol, Texaco Ursa for air compressors are protecting against mechanical failures and time out of service for cleaning.

More Lubrication for your dollars

TEXACO TESTED LUBRICANTS are preferred by air compressor operators because *they cost less to use.* You can feed them in very small quantities. Their exceptional freedom from carbon-depositing elements helps them to lower maintenance costs.

A representative of The Texas Company can show you convincing proofs of these benefits. And the way in which Texaco cooperates with your men helps them to devise valuable economies — important operating efficiencies.

THE TEXAS COMPANY

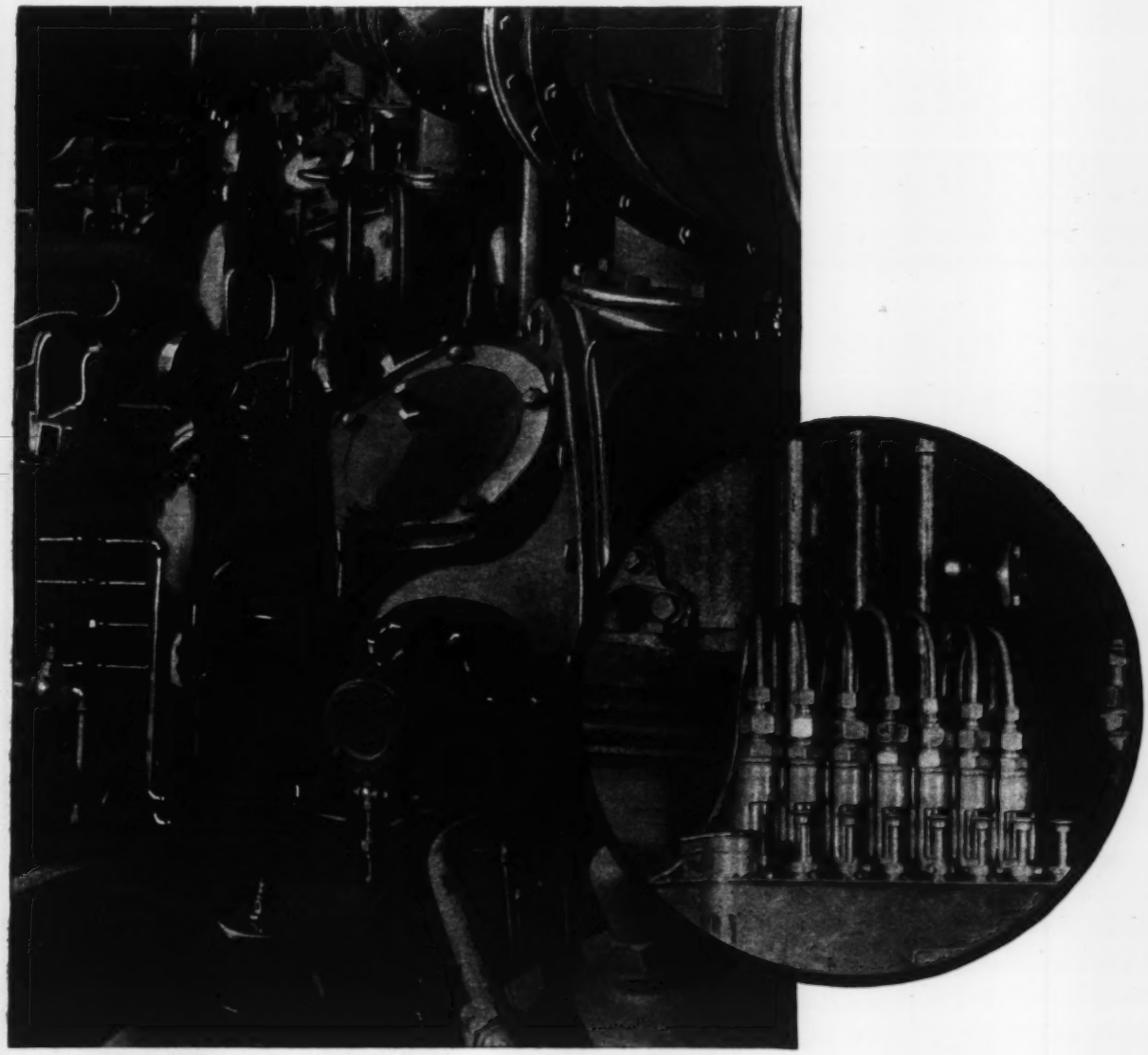
135 East 42nd Street New York City

Nation-wide distribution facilities assure prompt delivery

TEXACO *tested*

REFINERY TESTED FOR UNIFORMITY

COMPRESSORS



LUBRICANTS

SERVICE TESTED FOR ECONOMY

Plain Sedimentation . . . Chemical Precipitation . . . or Activated Sludge

At the right you see the raw sewage entering the Laughlin Filter—in the center, the effluent, so clear that the full depth of the side walls is visible.

Whatever system of sewage treatment you have . . . or are planning . . . it will operate more effectively and at lower cost with the Laughlin Filter!

- The Laughlin Filter fits into any system of sewage treatment and gets results not otherwise secured in that system.
- It removes suspended solids—positively and economically—and delivers a well-clarified effluent.
- Applied to the settling basin to remove more and finer settleable solids, it yields such advantages as are quoted at the right.
- Only large and settleable solids can be removed by bar screens, fine screens or settling basins.
- In cases not requiring nitrification, the Laughlin Filter will displace triclking and sand bed filters—or reduce the load and increase the capacity of those filters. It also practically eliminates the fly and odor nuisance and pooling.
- The Laughlin Washer has few moving parts, washes the bed automatically as required and permits continuous operation of filter without attention.
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- Investigate what is being accomplished in the chemical-mechanical plant at Dearborn, Michigan. Watch for the results of the experiments at Chicago, where the Laughlin Filter is added to an Activated Sludge plant—and at Coney Island, where it supplements Plain Sedimentation—and in other tests where it is added to and improves Chemical Precipitation. See the new plant soon to be put into operation at Perth Amboy, New Jersey.
- Four years of continuous testing and improvement permit us to furnish engineers with authoritative data which can be safely used as a basis for design. Write us for information.

With PLAIN SEDIMENTATION

. . . the Laughlin Filter increases removal of suspended solids from 40-50% to 65-70% without the use of chemicals—and steps up capacity without adding more clarifiers.

With CHEMICAL PRECIPITATION

Increases removal of suspended and colloidal solids from 70-80% to 90-95% with the same amount of chemicals—or reduces amount of chemicals required. Greatly increases flexibility of plant to meet daily or seasonal variations.

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Removes floc not settled out in final tank. Installed in primary tank, it cuts down load on aeration tank. Safeguards stream during temporary overloads or biological disturbances until plant can be brought under control. Reduces aerating period—amount of air required—or both.

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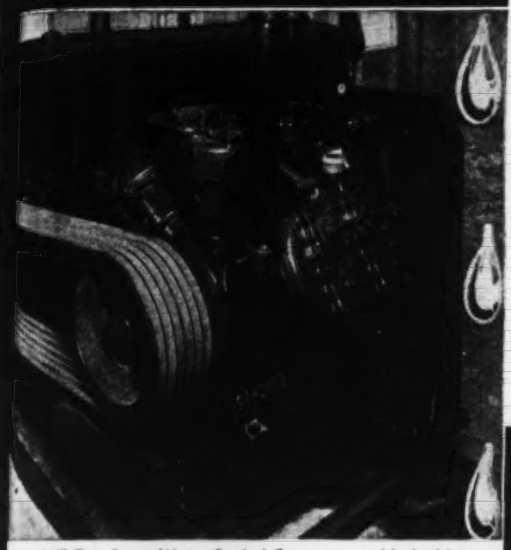
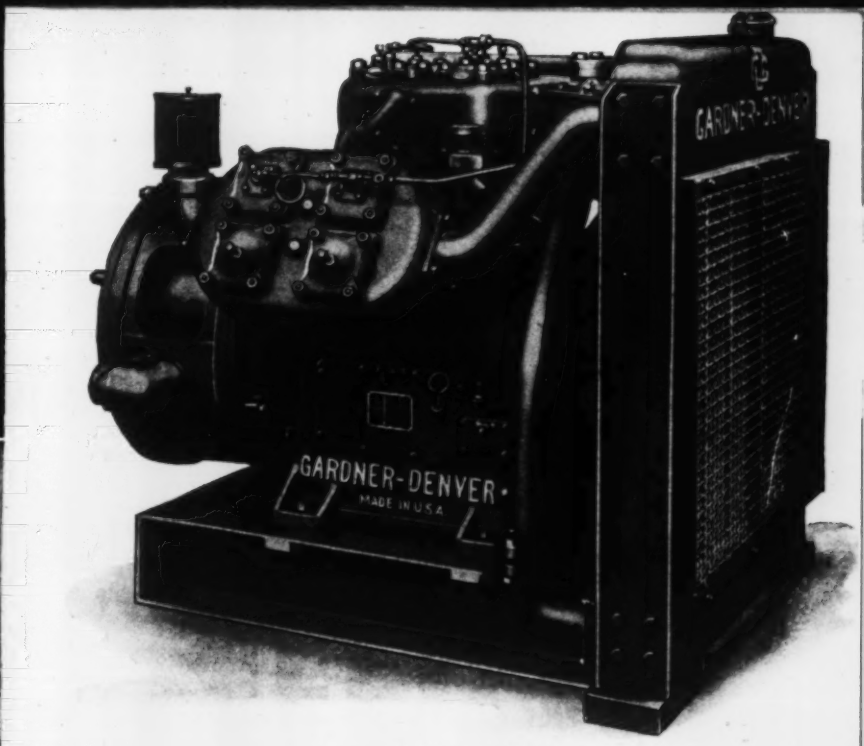
Even Where WATER is Scarce



Class WB Two-Stage Water-Cooled Compressor with double radiator assembly at Bruce Consolidated Mining Company.



WB Two-Stage Water-Cooled Compressor with Combination Radiator and Air-Cooled Intercooler.

You Can Now Have the Big Advantages of a WATER-COOLED Compressor!

WATER-COOLING means:

- Independence of atmospheric temperatures
- Low cylinder wall temperatures
- Low discharge temperature
- Absence of cylinder wall distortion from heat
- Less lubricating oil consumption
- Lower maintenance costs
- Better performance everywhere

COMPRESSORS with water-cooled cylinders are far more efficient in hot weather—far easier to start in cold weather—less costly to maintain in any season. AND NOW, even where water is scarce or of poor quality, you can have the big advantages of water-cooling by equipping Gardner-Denver "WB" Two-Stage Compressors with the Combination Radiator and Air-Cooled Intercooler, shown on this page. In this Combination, two core sections are standard water sections to cool the cylinder jacket water, the remaining sections comprising the air-cooled intercooler.

Gardner-Denver Two-Stage Water-Cooled Compressors are entirely independent of atmospheric temperatures, no matter where you are working. Winter or summer, they give you more air . . . cleaner, cooler and drier air . . . at low cost. Write for complete information on the WB Water-Cooled, Two-Stage line.

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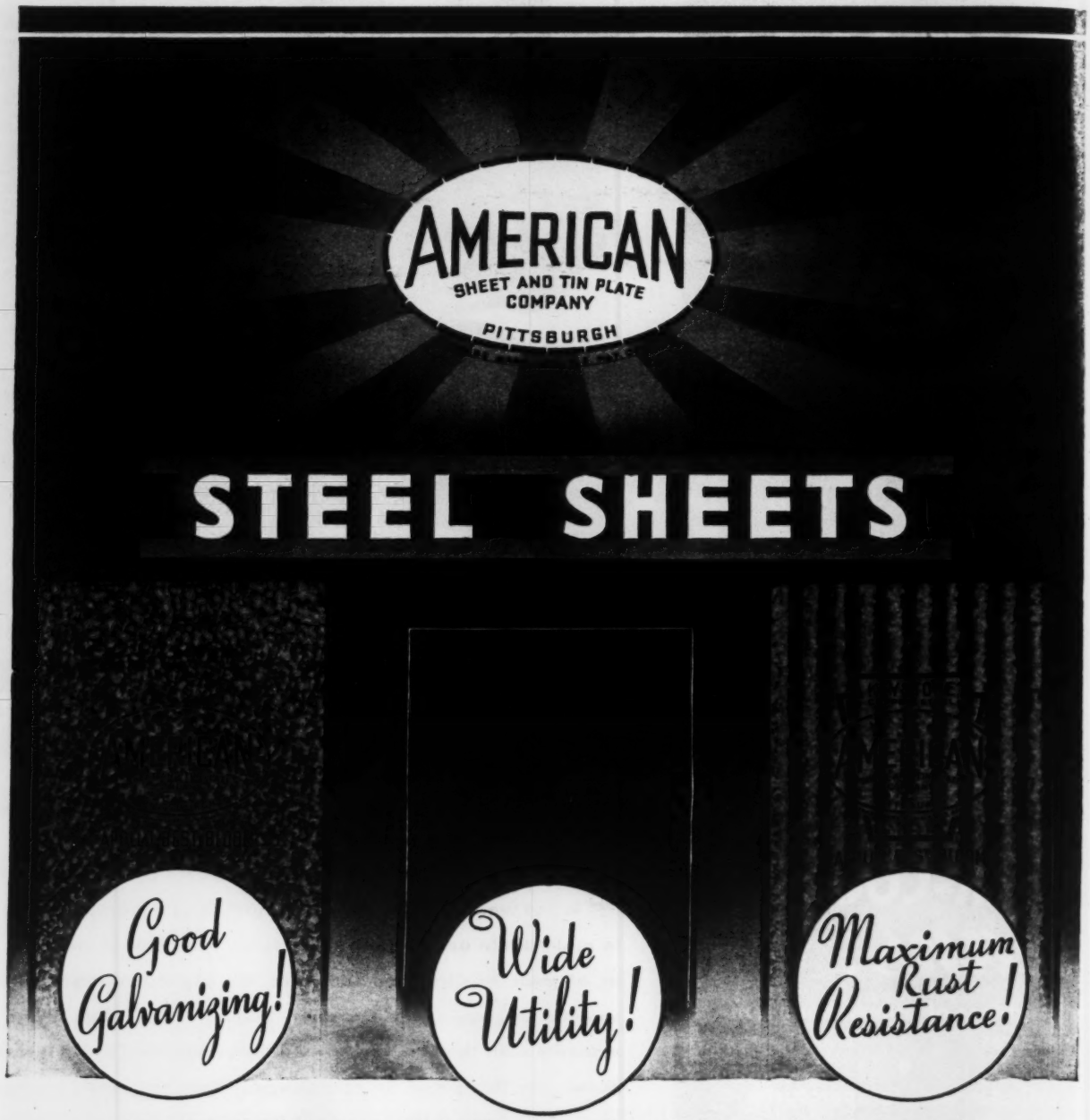

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Chapman Motor Units provide safe, sure remote valve control. Their powerful, slow-speed motors are fully protected against damage in case an obstruction jams the valve while in operation. They have few parts . . . are substantially built, weatherproof, steam-tight. They can even be furnished for completely submerged operation. Signal lights at the push button stations indicate whether a valve is opened, closed or in position for hand operation. It takes but a second to shift a valve from motor to manual operation—and a man can easily open the valve even under full pressure.

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If you are building a new project or modernizing an older one—be sure to specify Chapman Motor Units for all large valves and sluice gates. Write for illustrated bulletin today.

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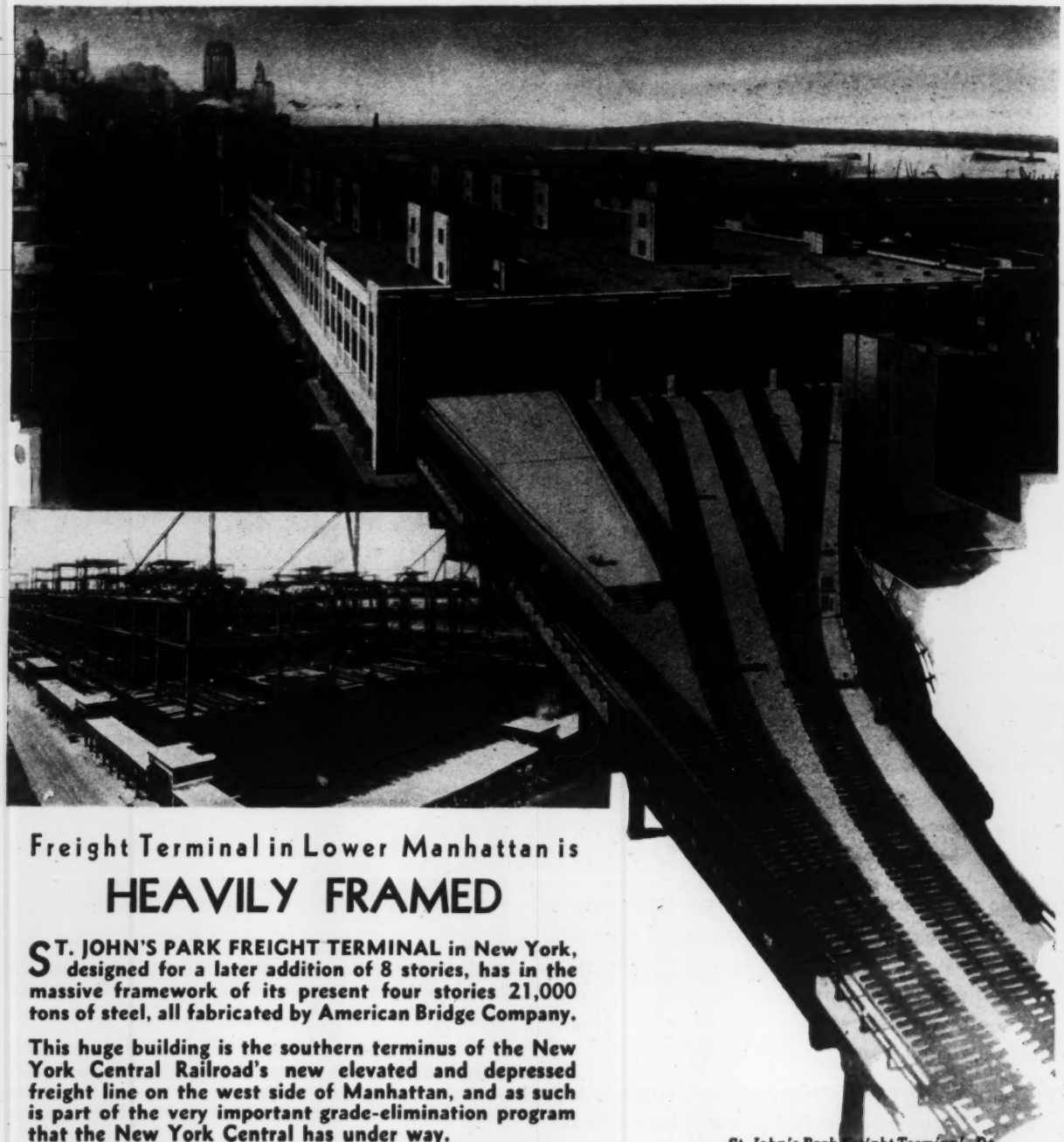

Freight Terminal in Lower Manhattan is

HEAVILY FRAMED

ST. JOHN'S PARK FREIGHT TERMINAL in New York, designed for a later addition of 8 stories, has in the massive framework of its present four stories 21,000 tons of steel, all fabricated by American Bridge Company.

This huge building is the southern terminus of the New York Central Railroad's new elevated and depressed freight line on the west side of Manhattan, and as such is part of the very important grade-elimination program that the New York Central has under way.

In ground area this building is impressive—800 feet long by 219 feet wide at one end and 276 feet at the other. Train tracks enter at the second floor level alongside unloading platforms which, by means of elevators, are accessible to trucking bays at the street level and to storage floors above.

St. John's Park Freight Terminal. Designed by the engineers of the New York Central Railroad. James Stewart & Co. of New York, General Contractors. Post & McCord, Inc., steel erectors. In addition to the steel for this Terminal, American Bridge Company has fabricated and erected part of the viaduct, and is now fabricating two depressed-track sections of the line.

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To SELL THEM AS Ready-Mixed Concrete

Selling Ready-Mixed concrete is the easiest way to turn sand, gravel and stone into cash — at the same time building up a business that will insure a steady profit income.

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Send for this New Book that Gives the Facts on Commercial Concrete

If you're even thinking about cashing in on the possibilities of commercial concrete business, send now for the new book "Mixing and Transporting Concrete With Rex Moto-Mixers and Agitators."

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A small plunger pump creates an oil pressure that forces lubrication to every vital part, and also operates the unloading piston. While the motor is attaining speed, *and when the oil level is low,* this oil pressure is insufficient to operate the unloading piston, and therefore the compressor idles.

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Here is a valuable protection feature—distinctive with this compressor.

The Type "Y" Air Compressor is manufactured in sizes ranging from 3.6 to 33 cu.ft. displacement and in various mountings for any requirement. Besides its controlled lubricating system interlocked with positive unloader, this compressor has other noteworthy features that commend it for use where a reliable and economical source of compressed air of small volume is required . . . Ask for Publication 9083.

WESTINGHOUSE AIR BRAKE CO.
INDUSTRIAL DIVISION
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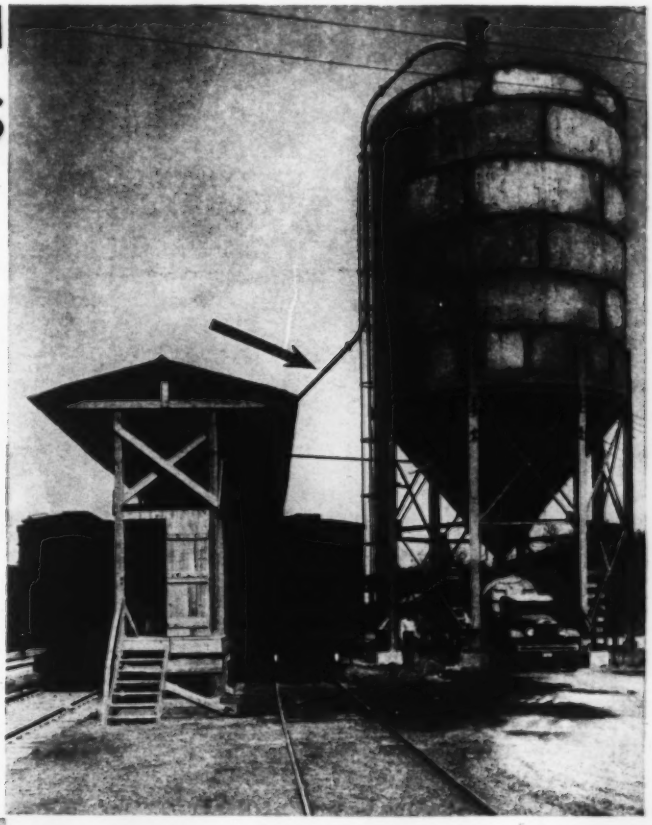
FULLER-KINYON CEMENT PUMPS AT NORRIS DAM



THE BULK CEMENT UNLOADING PLANT

TRUCK-HOPPER AND BIN AT THE DAM

THE CEMENT LINE TO MIXING PLANT

Two types of Fuller-Kinyon Systems handle the cement for this great project. Two portable pumps, unload box-cars and convey through independent pipe-lines to a truck-loading bin at the railroad siding. The arrangement, shown above, provides for the unloading of four cars without shifting. Special trucks transport the cement five miles to the mixing plant where the loads are dumped into a hopper above two stationary pumps. One of these pumps is for stand-by service, but is connected to the pipe-line system for instant use. Cement is conveyed either directly to the mixing plant, or through a branch line to storage. When trucks are not discharging, the cement is spouted to the same hopper for transfer to the mixing plant.

Fuller-Kinyon Pumps offer the contractor speed with reliability, economical long distance conveying and unequalled convenience in plant layout. Our bulletin fully illustrates the use of these interesting conveyors in all classes of concrete construction service. For preliminary information, write for a copy.

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No Attendant in Charge—

Yet these stations function perfectly

Entrance to Towson automatic pumping station of the City of Baltimore. Both the Towson and the Pikesville stations were designed by Mr. Leon Small, Water Engineer of the City of Baltimore. Pump rooms and all equipment are underground and below the frost line—stations are unheated

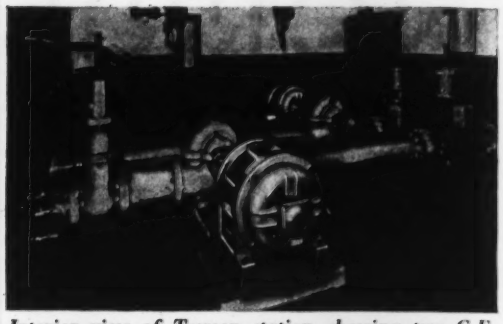
COMPLETELY equipped with G-E motors and control, the new Pikesville and Towson automatic pumping stations of the City of Baltimore have been giving continuous, dependable service for almost three years.

In each station are two pumping units. One of these is selected each week to be the operating unit, and the other acts as a standby unit. The special full-automatic G-E control provides for the starting and stopping of the selected pump in response to changing pressure demands, and also for the starting of the standby unit in case the selected unit is thrown out of service.

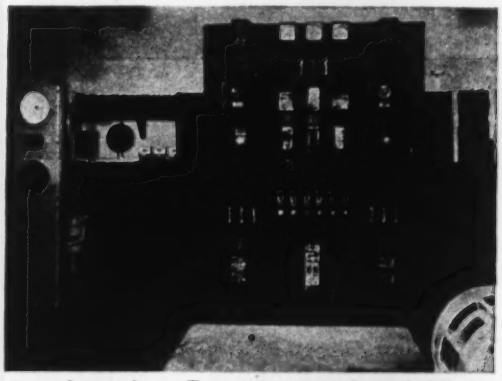
The only attention these automatic stations receive is a weekly visit for the purpose of changing the charts on the recording pressure gauges, changing the selected units, and making other routine adjustments.

However, the supervisor, by calling from any telephone, at any time, may obtain an audible indication as to suction and discharge conditions, and a complete report of the operating condition of the mechanical equipment. This is made possible by G-E automatic supervisory equipment.

G-E control engineers have the experience to design and apply correctly the special control apparatus required by jobs like these. For information on electric equipment for projects you are supervising, call or write the nearest G-E office. General Electric Company, Schenectady, N. Y.



Interior view of Towson station, showing two G-E 50-hp. motors driving Warren pumps. Suction valves at left, and automatic discharge valves at right



Control panel at Towson station. Control for the motors is in the cases at the right and left of the panel. The telephone transmitter, buzzer, and gong of the signaling system are in the box on the wall at the right

At Pikesville, G-E 30-hp. wound-rotor induction motors operate the Worthington single-stage pumps

080-44

GENERAL ELECTRIC

ENGINEERING NEWS-RECORD

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In The News:

Allotments to federal departments from relief-works funds are continuously, if slowly, winning Presidential approval. Meantime debate centers on the order limiting expenditures to $1,100 per man-year of direct labor. The President says it will not apply to grade-crossings; Secretary Ickes says it will not apply to housing; the durable-goods industries, and others who see profits in these industries as the principal hope of general recovery, think it should be rescinded.

In Appointing the Personnel of the recently created Queens-Midtown Tunnel Authority in New York City, Mayor LaGuardia told his appointees, "All that you have is an authority and an idea. It is up to you. You must create it. You have to construct it and operate it." "It" is an East River vehicular tunnel, to cost anywhere from $30,000,000 to $60,000,000.

Flood Damage to Austin, Tex., was only a small fraction of the $2,000,000 reported by news services.

Grand Coulee Dam received an allotment of $23,000,000 from the relief-works funds last Friday, to complete foundation excavation and start concreting. The design was changed recently.

Work Was Begun Last Week on a $3,500,000 addition to the East Works plant of the American Rolling Mill Co., at Middletown, Ohio. The new unit will comprise a cold-strip finishing mill for sheets up to 72 in. wide.

The FHA Has Reduced the maximum interest rate that may be charged to all classes of insured mortgages from 5½ to 5 per cent and has reduced insurance premiums from 1 to ½ per cent.

The First Rivers and Harbors Bill approved since 1930 includes 124 projects, to cost $203,000,000, for which PWA has already allotted $165,000,000, and 127 new projects to cost $167,000,000.

Improving New York's Hudson River Waterfront, according to plans proposed by Park Commissioner Moses but amended to provide for covering the N. Y. Central R.R. tracks as far north as 125th St., will be a riverfront boulevard at grade; the covering over the tracks will comprise a part of Riverside Park and must be paid for by special assessment.

Work on the Seminoe Dam and Power Plant of the Casper-Alcova project will start this summer, bids having been asked for July 22 by the Bureau of Reclamation.

In This Issue:

Concrete-placing Methods for sewer tunnels are exemplified by current work on the 27 miles of intercepting sewers being built in Chicago. Lining procedure, form handling, mixing and distributing-plant layouts are described in the third and last of a series of articles on this important sewerage undertaking.

Six Articles on Low-cost Roadbuilding are grouped, to give a broad picture of technique in this important new field. Summarized from papers delivered at various meetings of roadbuilders, the articles cover federal standards, farm service, oil mix, stabilized soil and tar-retread practices.

The Demonstrated Abilities of the engineers of the Bureau of Yards and Docks of the Navy Department in reinforced-concrete design and construction serve as a recommendation of the rigid-frame design procedure outlined in this issue.

Nearly 150 Siphons, with a combined length of 29 miles, form a part of the Colorado River Aqueduct under construction across 242 miles of mountain and desert between the Colorado River and Los Angeles. Such extreme topographic and climatic variation coupled with the presence of active earthquake faults posed a siphon design problem of unusual character. The fundamental structural and economic principles that have governed the design are instructively presented in the lead article.

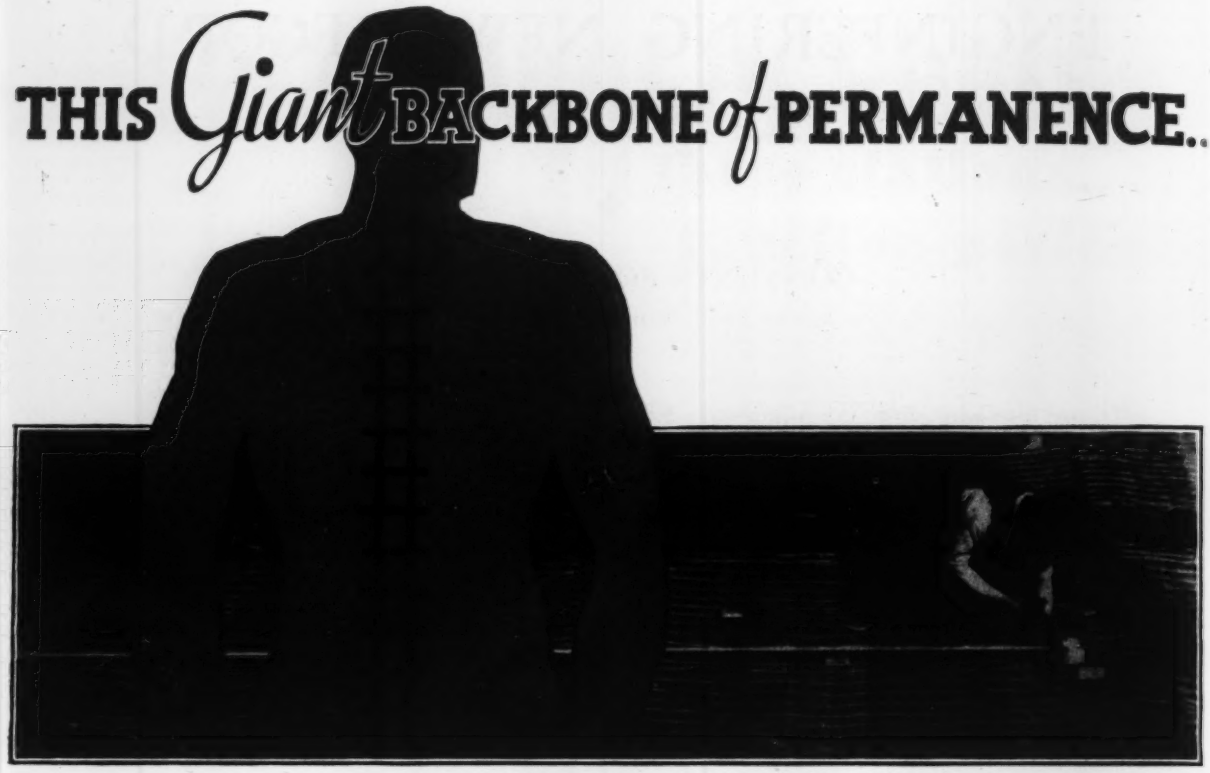
Prefabrication, which in this country has so far been associated largely with residential construction, is being successfully adapted in Paris to apartment houses. Steel and concrete frames, concrete-slab walls, floors and roofs are manufactured as units and assembled into a building. A feature of a project described in this issue is the use of tall tower buildings, rarely seen in European cities.

John F. Stevens' eighth article recounts how Jas. J. Hill's Northern Pacific and Great Northern railroads invaded central Oregon, stronghold of the Harriman Lines by purchasing a charter of doubtful legality and then pushing construction while the charter was being tested in the courts.

Index

An index for Volume 114, January-June, 1935, will be published in the issue of July 18.

THIS *Giant* BACKBONE *of* PERMANENCE..



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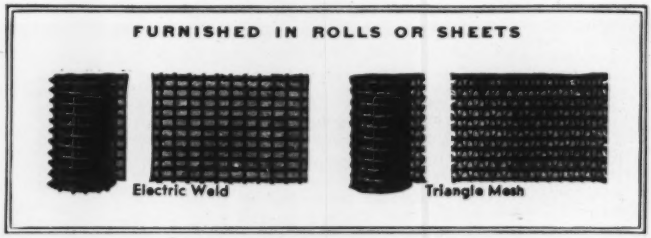
BUILD for tomorrow—but in building for the future, do not overlook today's need for speed and economy in floor slab construction. In this connection—you will find American Steel & Wire Company Wire Fabric the ideal reinforcement material. Available in rolls—it is exceptionally easy to handle—and keeps labor costs down to a minimum. This Wire Fabric—of highest quality and perfected design—reinforces the concrete slab in every direction. It provides continuous action from one end of the structure to the other—plus high elastic limits and ultimate tensile strength due to cold drawing. It is truly called "The Giant Backbone of Permanence." Interesting literature is available covering the use of this material in the nation's leading structures. This—along with technical data—will be forwarded on request.



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CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., Los Angeles—Metropolitan Water Dist., 306 West 3rd St., soon takes bids constructing 1 mi. aqueduct between North Hill and Martello Aves., Pasadena, alternate bids will be received on tunnel or cut-and-cover types of construction. To exceed $50,000. F. E. Weymouth, engr.

Calif., San Francisco—Dpt. P. Wks. plans awaiting P.W.A. approval for Sect. "B" Park-Presidio Dist. extension to municipal water supply system for fire protection. $72,000.

Conn., Stonington—Mystic Fire Dist. plans waterworks system, with Federal Aid. To exceed $15,000.

Ill., Hull—City plans waterworks and distribution system. P.W.A. project. Beard Eng. Co., Title Guaranty Bldg., St. Louis, Mo., engrs.

Ill., Lamoille — City plans waterworks improvements. P.W.A. project. Wells Eng. Co., Geneva, engrs.

Ia., Oelwein—City Council making plans waterworks system. $50,000. E. E. Schenk, engr.

La., Wisner—City retained Swanson & McGraw, Inc., Balter Bldg., New Orleans, to draw plans for new waterworks system. $40,000. Application to be made to P.W.A. for loan.

Mass., Gloucester — City, Dr. G. H. Newell, mayor, City Hall, plans for water reservoir on Bond's Hill in abeyance indefinitely. $150,000. Metcalf & Eddy, 1300 Statler Bldg., Boston, engrs. Noted June 17, C. D.—June 20, E. N.-R.

Mass., Wareham—Wareham Fire Dist., H. C. Newman, clk., Main St., soon takes bids driven wells at Swifts Beach, Hamilton Beach, Pinehurst and East Wareham. Fay, Spofford & Thorndike, 44 School St., Boston, engrs.

Mich., Bay City—City, Water Bd. authorized by City Officials to construct extension of city's raw water storage reservoir on Henry Rd. $25,000 to $30,000.

Mich., Bessemer—City making plans concrete reservoir, water supply preparatory to making application for P.W.A. financing. $124,900. C. Walker, Ironwood, engr.

Mich., Flint — City plans application to P.W.A. for grant in connection with financing water softening plant to treat city's water supply. $370,000. P.W.A. project. J. R. Pollock, dir. P. Wks. Noted Oct. 5, 1933, C. D.—Oct. 12, 1933, E. N.-R.

Mich., Marine City—City preparing plans water filtration plant, new intake to deep channel in St. Clair River, pumping equipment. $75,000. Also plans application to P.W.A. for loan. Pate, Hamann, & Hirn, 1610 Washington Blvd. Bldg., Detroit, engrs.

Miss., Greenwood—City, election July 2, $192,000 waterworks plant improvements, water supply system, sewage and sewage disposal system, electric transmission and distribution system.

Miss., Morton — City preparing plans new waterworks system, water well, c.i. pipe, storage tank, etc. $35,000. F. P. Gates, Jackson, archt.

Neb., Gordon—City plans election $19,000 bonds for waterworks and distribution system.

N. Y., Dunkirk—City survey made by Pitometer Eng. Co., for water supply system, will soon replace faulty pipes, connections, etc. in various parts of city. A. G. Walter, city engr.

N. Y., Jamestown—(CORRECTION)—City does not plan construction of new reservoir or addition to present reservoir at this time. Noted June 3, C.D.—June 6, E.N.-R.

N. Y., Lockport—City made plans water line, $40,000. Applied for P.W.A. funds. J. Frehsee, city engr.

N. Y., South Corning—Village plans constructing waterworks and distribution system for 714 residences. **Maturity later.** Engineer not appointed.

N. Y., Staatsburg—City plans new reservoir, c.i. pipe line to present reservoir, to this one, dam and dikes. $29,000. O. D'Luhosch, 2 Cannon St., Poughkeepsie, engr.

N. C., Durham—Municipality plans 1¼ m.g. elevated water tank. Est. about $160,000. **Maturity later.**

N. D., Steele—City making preliminary plans waterworks and sanitary sewers. P.W.A. funds to be sought. May call election to vote on construction. Ray Eng. Co., Wahpeton, engr.

Okla., Barnsdall—City making surveys new reservoir and filter plant. $60,000. V. V. Long & Co., Colcord Bldg., Oklahoma City, engrs.

Pa., Shillington — Borough made application to Public Service Comn. to buy and operate property of Mohnsville Water Co., also seeks permission to supply water in Lincoln Park Twp., Berks Co., Borough of Shillington and Mohnsville and portions of Cumru Twp. Borough officials on Mar. 14, authorized acquisition of company's system for $387,500 to be financed by bond issue.

Tex., Gladewater—City, c/o D. W. Cranfield, voted $150,000 bonds, to purchase and extend privately-owned system or build new water and sewerage system. $160,000.

Tex., Sonora—City, c/o W. C. Gilmore, mayor, plans application to P.W.A. for loan and grant to finance construction waterworks. H. R. F. Helland, 1020 Frost Bldg., San Antonio, engr. Noted Feb. 25, C. D.—Feb. 28, E. N.-R.

★**Wash., Seattle**—City, H. D. Fowler, city supt. Water, plans municipal water system along shore of Lake Washington, incl. 27 mi. mains, supplying 20,000,000 gal. water per day, also 42 in. pipe line from Cedar River Pipe Line 3 at Renton $1,450,000; 24 in. line from Lake Forest Park to reservoir about East 195th St. $40,000; two 20 m.g. concrete reservoirs near Forest Park $320,000; 20 in. pipe line from Foy Pumping Station at East 125th St. $35,000; hydraulic turbine-driven pumps at each reservoir with pipe lines and tanks $165,000. Total $2,000,000. Will apply for $900,000 grant and $1,100,000 loan from P.W.A. E. R. Hoffman, state P.W.A. engr.

B. C., Saanich—Municipality making plans constructing water tank. $2,000 available.

Ont., Port Stanley—Municipality bids in July for improvements to waterworks system. W. A. Hawkins, Port Stanley, engr. Noted June 14, C.D.—June 20, E.N.-R.

Que., Lachute—G. Felion, town secy., Lachute, soon takes bids new watermains and sewers.

BIDS ASKED

Ill., Anna—July 3, by City, R. L. Shannon, mayor, waterworks, $110,000. P.W.A. project. Warren & Van Praag, Inc., Millikin Bldg., Decatur, engrs.

Ill., Monticello—July 5, by City, rehabilitating and electrifying present waterworks, incl. iron removal and softening equipment, elevated steel tank and appurtenances, 12x12 ft. brick well house over present well, sewers, drains, manholes, and connections to present sewers, altering pumping station building, heating, lighting, plumbing facilities; new water piping and water main connections, two 350 g.p.m. motor driven turbine pumps in present wells, two 350 g.p.m. motor driven horizontal centrifugal pumps; one 700 g.p.m. horizontal centrifugal service pump, gasoline driven; one master water meter, 1 recording depth gage, 1 recording pressure gage, 1 master water meter; iron removal system, pressure aerators, pressure sand filters, air compressor; water softening system, pressure zeolite water softeners with pipe and appurtenances, one 150,000 gal. steel tank on 136 ft. elevated tower with concrete foundations, etc. Warren & Van Praag, Decatur, engrs.

Mich., Detroit—July 2, by E. H. Bauer, acting secy. Dpt. Water Supply, 735 Randolph St., furnishing, installing equipment for operating of 2 long distance pressure gages for Springwells Station for Detroit Dpt. Water Supply. Part of P.W.A. project approved. G. H. Fenkell, Water Bd. Bldg., Detroit, engr.

Tex., Lovelady—July 5, by City, distribution system, well and pump, elevated steel tank, $24,000. P.W.A. financed. Engineering Service Corp., Shell Bldg., Houston, engrs. Noted Oct. 28, C. D.—Nov. 1, E. N.-R.

Wash., Omak—July 9, by City Council, improving local water system, incl. 5,000 ft. 4 and 6 in. wood pipe; 7,900 lin.ft. 6 in. and 10 ft. c.i. pipe; vertical pumping unit, fire hydrants, valves and fittings. Noted Mar. 15, C. D.

CONTRACTS AWARDED

Ark., Fort Smith — City, constructing dam, filter plant, roads and bridges, operators' residences and clearing of site, to M. E. Gilliozi, Monette, Mo., $543,195***constructing 115,500 ft. steel pipeline, between Fort Smith and lake-site near Mountainburg, to Williams Bros., Exchange Bank Bldg., Tulsa, Okla., $746,226 ***construction of c.i. pipe within city limits, to B. & M. Constr. Co., Oklahoma City, Okla., $110,137. Grand total $1,399,558. **P.W.A.** Bids June 17. Noted May 21, C. D.—May 23, E. N.-R.

★**Conn., Hartford**—Bd. Contr. & Supply, Metropolitan Dist., Contr. 17, second portion of Bills Brook Dam on each branch of Farmington River, involving 122,000 cu.yd. earth and 6,000 cu.yd. rock excav., etc., to B. Perrini & Sons, Inc., Framingham, Mass., $550,778. Bids June 5. Noted June 7, C. D.—May 16, E. N.-R.

Massachusetts—C. J. Maney Co., Inc. and B. Perini & Sons, Inc., general contractors, 50 Congress St., Boston, concrete forms in connection with construction of rein.-con. caisson core wall at earth dam, Belchertown, Enfield and Ware, for Comn. of Mass., Metropolitan Dist. Comn., Water Supply Div., 20 Somerset St., Boston, to Blaw-Knox Co., 798 Albany St., Boston***rods, bolts and miscellaneous steel, to McClintic-Marshall Corp., 75 Federal St., Boston. Noted May 13, C. D.—May 16, E. N.-R., under "Contracts Awarded."

†*Federal Government.*

For official proposal advertising see Searchlight Section

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Reports noted back to former issues are designated as follows:
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Federal Government projects symbol †

◆

Mass., Lowell—City, Water Works Dpt., City Hall, constructing 35 gravel packed wells, P.W.A. Docket 6044, Contr. 4, to Tuller Constr. Co., 95 Monmouth St., Red Bank, N. J., $507 per well. **P.W.A.** Bids May 28, awarded June 18. Noted June 3, C. D.—May 23, E. N.-R.

Mass., Weymouth—Town, Bd. Water Comrs., Town Hall, steel tank at Great Pond Filtration Plant, to Chicago Bridge & Iron Wks., 250 Stuart St., Boston, $2,890. Bids June 10, awarded June 14. Noted June 14, C. D.

N. J., Bayonne—City constructing watermains in Kearny Meadows, to J. L. Sigretto, 405 Levingston Ave., New York, N. Y., $151,870. **P.W.A.** Bids May 7, awarded June 11. Noted May 9, C. D.—May 2, E. N.-R.

N. Y., East Rochester—City, water supply Contr. 3, c.i. pipe, to United States Pipe & Fdry Co., Burlington, N. J., $2,483. **P.W.A.**

Pa., Finleyville—J. P. N. Rankin, secy. Borough, constructing complete waterworks system, to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, $16,048. Bids June 12. Noted June 4, C. D.—June 6, E. N.-R.

Pa., Pittsburgh—M. C. Smith, secy. Shaler Twp., Mt. Royal Rd., Shaler Twp., Pittsburgh, 18 mi. water system, to Frank Manella & Sons, 1507 North Lang Ave., $189,715. Est. $223,000. **P.W.A.** Bids Apr. 23. Noted May 8, C. D.—Apr. 11, E. N.-R.

Tex., Manor—City, W. H. Wendland, mayor, well and pump for waterworks, to W. B. Hinton, Lockhart, $18,000. **P.W.A.** Bids Apr. 26, awarded June 17. Noted Apr. 15, C. D.—Apr. 18, E. N.-R.

Wis., Princeton—City, hydrants, valves, valve boxes, to Iowa Valve Co., 701 Hubbell St., Des Moines, Ia., $3,163***sewers, watermains, to R. E. Jilby, Hartland, $8,326***elevated tank, to Pittsburgh-Des Moines Steel Co., 38 South Dearborn St., Chicago, Ill., $5,500***flow meter, to Minneapolis Honeywell Regulator Co., 2763 4th Ave. S., Minneapolis, Minn., $313. Grand total $57,302. Bids Apr. 18. Noted May 2, C. D.—Apr. 11, E. N.-R.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Colo., Paonia — City reports in progress sewage disposal plant, E. T. Archer & Co., 619 New England Bldg., Kansas City, Mo., engrs.

Ga., Monticello—City, F. Fenn, mayor, City Hall, voted bonds and preparing plans sewerage system, incl. sludge beds, 9 mi. vitr. clay sewer lines. Will probably build with F.E.R.A. labor. H. H. Jordan, Healey Bldg., Atlanta, engr.

La., Winnsboro—City retained Swanson & McGraw, Inc., engrs., Balter Bldg., New Orleans, to make surveys, prepare plans and specifications for PWA loan for sewage treatment plant, water and sewage extensions, generating unit municipal building.

★**Mass., Fall River**—City, Superintendent of Water Dpt., 1620 Bedford St., Fall River, had report made at office of S. M. Ellsworth, consult. engr., 12 Pearl St., Boston, for intercepting sewer and sewage treatment plant. Est. about $2,300,000. City is taking steps to

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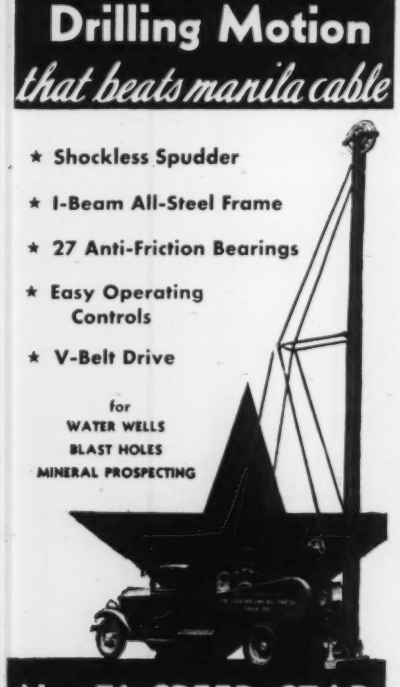

No. 71 SPEED STAR

THE STAR DRILLING MACHINE CO., AKRON, O.

Sewerage, etc. (Continued)

secure federal funds for this project. Noted June 11, C. D.—June 13, E. N.-R.

Mich., Pontiac—City made plans sewage disposal plant to take care of city sewage and nearby Pontiac State Reformatory. $100,000. P.W.A. project. J. J. Woltman, Bloomington, Ill., engr.

Mich., South Lyons—City retained Hayden & Kunze, engrs., 900 Lawyers Bldg., Detroit, to prepare plans and file application for P.W.A. financing for sewers and sewage disposal plant to serve community, incl. vitr. and concrete sewers, manholes and connections, disposal tank. P.W.A. project.

Mich., Utica — Village plans sewage system, incl. sewers, outlet section and connections. P.W.A. application to be made. Pate, Hamann & Hirn, 1610 Washington Blvd. Bldg., Detroit, engrs.

Miss., Booneville—Town plans application to P.W.A. for loan to finance extension of sewerage system and construction of swimming pool, as soon as estimates are available.

Miss., Greenwood—See "Waterworks."

†Miss., Vicksburg — National Park Service, Dpt. Interior, Wash., D. C., indefinitely postponed bids to have been opened June 10, sewers and sewage disposal plant at Vicksburg National Park. Noted June 7, C. D.

Mo., Clayton (St. Louis P. O.)—Clayton Outfall Sewer Dist. voted $226,000 for constructing sewers in Clayton Outfall Sewer Dist. Applied for $48,000 P.W.A. funds. Kinsey Eng. Co., 20 South Central Ave., engrs. Noted May 13, C. D.—May 16, E.-N. R.

Mo., Mexico—City bids early in July sewers and disposal plant. $88,000. J. W. Shikles & Co., 708 New York Life Bldg., Kansas City, engrs. Noted May 13, C. D.—May 16, E. N.-R.

Mo., St. Louis—Bd. P. Service, City Hall, plans garbage disposal plant equipped with 2 garbage grinding units, in Mill Creek Valley Section. $40,000. Appropriation ordinance pending before Bd. of Alderman. Private plans.

N. J., Camden — Camden Co. plans sewage treatment plant. $135,000. P.W.A. project. Remington & Goff, 509 Cooper St., Camden, engrs. Noted Apr. 26, C. D.—May 2, E. N.-R.

N. Y., Batavia—City plans trunk line water sewer in southeastern section. $100,000.

N. Y., Bath—Village plans sewage disposal plant and sewers. $170,000.

N. Y., Jamestown—City plans improving sewage disposal plant. $40,000. L. L. Graham, city engr.

N. Y., Lockport—City, Emergency Relief Bureau plans 15 in. tile sewer line in Center Alley between Locust and Pine Sts. and Hinman Rd. Est. about $25,000. Owner will offer $25,000. Work Relief Bond Issue at auction at once.

N. D., Bismarck—City plans pre-sedimentation basin, sludge removal and flocculator equipment. $30,000. T. R. Atkinson, city engr.

N. D., Steele—See "Waterworks."

R. I., Providence—City, C. A. Maguire, P. Wks. Dpt., plans new incinerator, Allens Ave. $475,000.

Tenn., Chattanooga—City soon takes bids constructing 0.023 mi. sewers in First Ward, $3,450; 0.58 mi. in 4th Ward, $8,700; 0.12 mi. in 7th Ward, $1,800; 0.39 mi. in 8th Ward, $5,850; 0.21 mi. in 11th Ward, $3,150; 3.86 mi. in 12th Ward, $57,900; 1.71 mi. in 13th Ward, $25,650; 1.27 mi. in 14th Ward, $19,050; 10.77 mi. in 15th Ward, $161,550; 0.8 mi. in 19th Ward, $21,000. Total $299,100. A. Black, Municipal Bldg., engr.

Tex., Brownsville—City, Z. A. Rosenthal, city mgr., filed application with P.W.A. Board for loan to finance extension of present sanitary sewerage system, incl. additional large mains extension and some replacements. $250,000. G. M. Hilyer, Brownsville, engr.

Tex., Gladwater—See "Waterworks."

Que., Lachute—See "Waterworks."

BIDS ASKED

Calif., Los Angeles—July 17, by Bd. P. Wks., furnishing, installing piping for gas and hot and cold water, involving excavation and backfill, 1¼- to 4-in. c.i. pipe, 1¼ in. and less galvanized iron pipe, c.i. fittings, gas cocks and gas plug valve, swing check valves, combustion trap, water circulating pump, 2 in. water meter, 1,000 gal. fuel oil tank, hot water boiler, etc., for Terminal Island Sewage Treatment Plant. To exceed $1,000. Lloyd & Aldrich, City Hall., engr.

Conn., Hartford—July 2, by Bd. Contr. & Supply, constructing part of South Branch Sewer, 5,400 ft. 63, 60 and 57 in. diameters. R. Dillon, clk. Metropolitan Dist. of Hartford County Bd. Contr. & Supply.

Mass., Medford—July 2, by City, J. C. Gillis, Street Comr., concrete sidewalks and drainage structures. $100,000 appropriated. H. J. Nicholson, city engr.

Mass., Worcester—See "Contracts Awarded."

Mich., Ann Arbor—July 22, by Bd. P. Wks., at office of F. C. Perry, city clk., Contr. 7, 22x30 ft. pumping station, within city limits, and sewage treatment plant, near Geddes, 4 mi. east of here. Ayres, Lewis, Norris & May, Cornwell Bldg., Ann Arbor, consult. engrs. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engrs.; adv. E. N.-R. June 27.

Mich., Ann Arbor—July 22, by Bd. P. Wks. at office of F. C. Perry, city clk., vacuum filters for sewage treatment plant, Contr. 4. Shoecraft, Drury & McNamee, State Savings Bank Bldg., consult. engrs.; adv. E. N.-R. June 27.

Mo., Springfield—July 2, by City Clerk, constructing waterway culvert and drainage project, Bond Issue Sewer Project 24, for 8,980 cu.yd. earth and 400 cu.yd. rock excavation, 1,800 cu.yd. concrete in place, 158,400 lb. reinforcing steel, 1 inlet, 2 manholes, 60 ft. 10 in. vitr. clay pipe and 400 lb. castings. P.W.A. project. Russell & Axon, 4903 Delmar Blvd., St. Louis, engrs. J. F. Hendrickson, city engr.

N. J., Elizabeth—July 11, by Joint Meeting Council Chamber, City Hall, East Orange, constructing outfall sewer and chamber for Roselle Park Boro, Hillside, Maplewood and Millburn Twps., East Orange, Irvington, Newark, South Orange, Summit, Union, West Orange, Div. K. Contr. D. A. Potter, 50 Church St., New York, ch. engr.; adv. E. N.-R. June 27. Noted Mar. 21, C. D.—Apr. 4, E. N.-R.

N. Y., Brentwood — July 24, at office Dpt. Mental Hygiene, State Office Bldg., Albany, constructing sewer and water lines at Pilgrim State Hospital.

N. Y., Brooklyn — July 10, at office Dpt. Mental Hygiene, State Office Bldg., Albany, constructing sewers and water lines at Brooklyn State Hospital.

N. Y., Rochester—See "Contracts Awarded."

Pa., Pittsburgh — July 9, by M. C. Smith, secy. Shaler Twp., Municipal Bldg., Shaler Twp., 22 mi. sewers, Shaler Twp. $190,000. F. G. Ross, 309 4th Ave., engr. Bids Apr. 23, rejected. Noted Apr. 5, C. D.—Apr. 11, E. N.-R., under "Waterworks."

R. I., Woonsocket—See "Contracts Awarded."

Tenn., Jackson—July 10, by City Comn., Subproject "A" for construction of sanitary sewerage extensions in East and West Jackson; Subproject "B," constructing an aerator and 3 mg. reservoir and making necessary changes in piping and installation of one high head pump; Sub-project "C," furnishing one low-head and one high-head pumps; Sub-project "D-1," furnishing approximately 4,100 water meters; Subproject "D-2," furnishing 4,100 meter boxes and 4,100 meter holding devices; Sub-project "E," installation of above meters, meter boxes and holding devices. L. Taylor, mayor; adv. E. N.-R. June 27.

W. Va., Huntington—City bids about July 15, 100 ton incinerator near Owens-Illinois Glass Co. plant. $68,000-$75,000.

CONTRACTS AWARDED

Conn., Torrington—City, sewage disposal plant equipment, sedimentation and tank mechanism, to Link Belt Co., 20 Providence St., Boston, Mass. Est. exceeds $25,000. Noted May 29, C. D.

Ill., Peoria — Greater Peoria Sanitary & Sewage Disposal Dist., gas engines and generator, to Worthington Pump & Mchy. Corp., Harrison, N. J., $32,972***electrical equipment, to Fries-Walters Co., 2001 West Pershing St., Chicago, $5,633***gas holder and control equipment, to Graver Tank & Mfg. Co., East Chicago, $10,574***purifier equipment, to Western Gas Constr. Co., Fort Wayne, Ind., $7,093***blower building addition and piping, to R. Iven, Peoria, $23,857. Grand total $89,129. P.W.A. Bids May 14. Noted Apr. 19, C. D.—Apr. 25, E. N.-R.

Mass., Worcester—City, J. H. Brooks, supt. Sewers, 20 East Worcester St., 8 and 10 in. vitr. clay sewer lines in Brookline and Homer Sts., Tory Fort Lane, Electric Ave., day labor. Work starts soon. $37,550. Private plans by R. Lingley, city engr.

N. J., Verona—Mayor and Boro Council, constructing mechanical type sewage disposal plant, to Carlson Co., 89 Walnut St., Montclair, $143,717***heating to J. H. Nelles Co., 835 Springfield Ave., Irvington $1,764***electrical work, to H. W. Electric Co., 49 Lawrence St., Newark, $4,473. Grand total $149,954. P.W.A. Bids June 4. Noted June 17, C. D.—May 23, E. N.-R.

N. Y., Hastings-on-Hudson — Westchester County Sanitary Sewer Comn., County Bldg., White Plains, constructing Sect. D-1 North Yonkers Project Sewer to Inter County Constr. Corp., Rye. $193,000. P.W.A. Bids June 7. Noted May 16, C. D.—May 23, E. N.R.

N. Y., Long Island City—W. Kennedy Constr. Co., general contractors, 215 Montague St., Brooklyn, about 450 tons reinforcing steel for incinerator, Flushing area, to J. T. Ryerson & Son, 203 Woodside Ave., Jersey City, N. J., for Dpt. Sanitation, New York. Noted May 27, C. D.—May 30, E. N.-R., under "Contracts Awarded."

N. Y., Rochester — City, constructing sewer in Beach Ave., $4,900; storm sewer in Holcomb St., $6,393; storm sewer in Winans St., $6,410; storm sewer and paving Rosenbach Alley, $11,462; storm sewer in Mount Hope Cemetery, $6,160; paving Marsh St., 7,337, Raeburn Ave., $2,304, by day labor. Grand total $44,966.

N. Y., Scarsdale—Village, Village Hall, Overlook Sewer, to F. Bracalello Inc., Scarsdale, $26,487; Hutchinson Sewer, to G. Lindine, 73

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†Federal Government.

Sewerage, etc. (Continued)
Batavia St., Harrison $8,892. **P.W.A.** Bids Mar. 29. Noted Mar. 26, C. D.

O., Columbus — W. J. Lucks, dir. Service, 6,170 ft. 6- to 15-in. vitr. clay relief sanitary and storm sewers, Part 1, Indian Springs, to General Constr. Co., 337 South High St., $32,513. Est. $40,900. **P.W.A.** E. P. Coady, City Hall, engr.

O., Fairport Harbor—Diamond Alkali Co., crib and intake line, to Chas. H. Strong & Sons Co., Guardian Bldg., Cleveland. Est. about $50,000.

O., Springfield — City Manager, Sect. "J" Contr. 12, Buck Creek, Intercepting Sewer, to Connelly Bros., 2nd Natl. Bank Bldg., Cincinnati, $32,345. Est. $36,200. **P.W.A.** (**Correction**—contractor's address.) Noted May 24, C. D.—May 30, E. N.-R.

R. I., Woonsocket—City, Water & Sewer Dpt., City Hall, drainage system in various streets, day labor. $29,000.

Tenn., Nashville—**At office of S. K. McKay**, city clk., City Hall, refuse incinerator plant, 124 tons in 24 hr. capacity, founds., building, furnaces and all appurtenances, chimney, approach roadway, power line, sewer, etc., West bank of Cumberland River, between Jefferson St. bridge and city light plant, to M. and Q. Constr. Co., Arcade St., $77,244. Est. $100,000. **P.W.A.** Bids May 28, awarded June 18.

†**Tenn., Nashville**—National Park Service, Dpt. Interior, Wash., D. C., sewer and water distribution system, to W. L. Hailey & Co., Cotton State Bldg., $12,985.

Tex., Houston—City Council, second section of sewerage system to serve several suburban areas, to Russ Mitchell, Inc., 2701 Texas Ave., $115,737. **P.W.A.**

Wash., Seattle—**City, 7,800 ft. 36- to 72-in.** concrete-centrifugal cast pipe, wood siphon, for Ballard Trunk Sewer, to L. Coluccio & Co., 1642 Lane St., $244,394. Est. $250,000. Bids June 4. Noted June 7, C. D.—May 23, E. N.-R.

Wis., Princeton—See "Waterworks."

Wis., Wauwatosa — City, storm sewers in West North Ave., easements, West Garfield Ave., Sect. 2, to G. E. Zimmerman Co., 3402 West Wisconsin Ave., Milwaukee, $29,066; in West North Ave., North 70th St., West Memicke Ave., easement to West Wright St., Sect. 3, to Werner Co., 2455 North 68th St., Wauwatosa, $41,965. Bids June 5 and 10. **P.W.A.** Noted June 11 and June 18, C. D.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Fla., Jacksonville—War Department has given approval for building new treated timber bridge with steel and concrete draw span over Cedar Creek, between Venetia and Jacksonville Heights, suburbs of here, $40,000. J. A. Long, co. engr., Jacksonville, will be in charge of project.

Mo., Kansas City—City making plans 685 ft. steel, rein.-con. viaduct, 63rd St. and Frisco tracks, $700,000. Ash, Howard, Needles & Tannen, 1010 Orear Leslie Bldg., engrs.

★**N. H., Manchester** — City, D. F. Cronin, chn. Bd. P. Wks., City Hall, plans constructing Hillsboro Bridge, rein.-con., structural steel, $500,000. Will make application to P.W.A. for funds.

N. J., Mantoloking — Bd. Freeholders Ocean Co. plans new bridge over Barnegat Bay, $200,000. Applied for $90,000 grant from P.W.A. and $110,000 from State Hy. funds. H. C. Shinn, Lakewood, engr.

N. Y., Batavia—City, F. H. Weber, clk., plans new highway bridge on Lyons St. $45,000. **Maturity indefinite.**

N. Y., Elmira—Erie R. R. Co., G. S. Fanning, ch. engr., Midland Bldg., Cleveland, O., soon takes bids constructing central switch tower, to operate switches by remote control (signal and interlocking system) in connection with eliminating grade crossing.

N. Y., Jamestown — City plans bridge over Chadakoin River Valley from Washington St. to Prather Ave. $350,000. **Maturity indefinite.** L. L. Graham, city engr.

Pa., Pittsburgh—Allegheny Co. Authority, S. Eckles, chn., County Office Bldg., rejected bids opened June 4, constructing Liberty Tube Plaza grade separation at intersection of West Liberty Ave. and Saw Mill Run Blvd., at south end of the Liberty Tubes relocation of Pioneer Ave. and work incidental thereto. $1,500,000. E. L. Schmidt, County Office Bldg., engr. Noted June 7, C. D.—June 13, E. N.-R.

Texas — State Hy. Comn., H. Hines, chn., Austin, authorized application to P.W.A. to build bridge over Neches River, near Drydens Ferry, in Jefferson and Orange Counties.

Tex., San Angelo—Atchison, Topeka & Santa Fe Ry. Co., c/o H. B. Lautz, Amarillo, preliminary plans rein.-con., steel underpass, under North Concho St. $60,000.

B. C., Vancouver—City, City Hall, plans constructing 1st Avenue over Great Northern Railway tracks, by steel, concrete viaducts to False Creek Industrial subdivision, $400,000. Brackenridge, city engr.

†*Federal Government.*

Ont., North Bay—Dpt. Northern Development, Toronto, soon takes bids 100 ft. concrete, steel bridge on Sturgeon Falls Hy., near here, $25,000.

Que., Quebec City—Provincial Govt., O. Desgardins, engr., Dpt. Roads, bids in July replacing wood bridge with steel bridge, $100,000.

BIDS ASKED

New York—July 5, by H. A. Lane, ch. engr., Staten Island Rapid Transit Co., Baltimore & Ohio Central Bldg., Baltimore, Md., furnishing, fabricating and delivering 1,500,000 lb. structural steel for 9 bridges for eliminating grade crossing Port Richmond-Towner Hill, Staten Island; adv. E. N.-R. June 27.

New York — July 8, by Triborough Bridge Authority, 111 8th Ave., New York, excavating for depressed roadway, Astoria Blvd., Queens Connection of Triborough Bridge connecting Manhattan, Bronx and Queens Boros, Contr. 33, P.W.A. project. P. Loeser, dir.; adv. E. N.-R. June 27.

Pa., Mercer—July 2, by Comrs. Mercer Co., Bridge 2332 over Haywood Hollow on Hamilton St., Farrell. F. P. Graham, 1st Natl. Bank Bldg., Grove City, engr.

Pa., Pittsburgh—July 2, by R. G. Woodside, controller Allegheny Co., removal and disposal of bridge structure, reconstruction of new superstructure and new substructure, incl. grading approach, and providing temporary footwalk, Streets Run; removal and disposal of existing bridge superstructure, removal of parts of masonry walls, removal of parts of existing roadway, reconstruction of new bridge and sidewalk, and provide a temporary bridge for maintenance of vehicular and pedestrian traffic, Long Run; 5th Ave. Bridge 3, over Yoghiogheny River, demolition of structure, McKeesport; cleaning and painting fence on top of the retaining wall on the easterly side of North approach and light posts on the North approach over Monongahela River, Pittsburgh. P. H. Martin, County Office Bldg., Pittsburgh, engr.

Wyoming—See "Streets and Roads."

LOW BIDDERS

★**B. C., New Westminster**—Hon. F. M. MacPherson, minister P. Wks., Parliament Bldg., Victoria, June 10, constructing high level bridge over Fraser River, from Dominion Bridge Co., Ltd., 275 First St. W., Vancouver, $2,723,101. Noted May 7, C. D.—May 9, E. N.-R.

CONTRACTS AWARDED

Alabama — State Hy. Dpt., Montgomery, bridges on Florence-Athens Rd., Lauderdale Co., to W. F. Scott Co., Inc., Thomasville, Ga., $51,080***on Eutaw-Tuscaloosa Rd., Greene Co., to Dunn Constr. Co., Birmingham, $6,875. Bids June 6. **P.W.A.** Noted June 13, C. D.

Ill., Decatur—Dpt. P. Wks. & Buildings, Div. Hys., 2 pile bridges and 4 concrete box culverts on Sect. 302B-MFT, near Oakley, to C. R. Miller & Sons, Decatur, $25,400.

Indiana—New York, Chicago & St. Louis R.R. Co., A. V. Harvey, ch. engr., Terminal Tower, Cleveland, O., structural steel for railway bridges at Albany and Muncie, to Fort Pitt Bridge Wks., 15 Park Row, New York.

Indiana—State Hy. Comn., Indianapolis, 3 span 72 ft. rein.-con. bridge in Crawford Co., to Ryan & Ryan, Inc., Washington $30,094 est. $35,906; 2 bridges one over Indian Creek, other over Fall Creek, in Marion and Madison Counties, to A. L. Deniston, Rochester, $40,032 est. $44,835. Bids May 28. Noted May 31, C. D.—May 23, E. N.-R.

Ia., Washington—See "Streets and Roads."

Mass., Athol—Commonwealth of Massachusetts, Dpt. P. Wks., 100 Nashua St., Boston, Contr. 2, constructing 2 rein.-con. bridges, to Wey Constr. Co., 1 State St., Boston, $43,419. **P.W.A.** Bids May 28, awarded June 19. Noted May 14, C. D. and May 16, E. N.R. under "Massachusetts, Streets and Roads."

Mississippi—E. D. Kenna, dir. State Hy. Comn., Standard Bldg., Jackson, constructing standard deck approach spans, on 0.223 mi. Yazoo City-Belzoni Hy., NRH 179-G, Yazoo Co., to Missouri Valley Bridge & Co., Leavenworth, Kan., $239,000. Est. $150,000. **P.W.A.** Bids May 28. Noted June 4, C. D.—May 16, E. N.-R.

Missouri—State Hy. Dpt., Jefferson City, bridges in Pulaski and Phelps Counties, to H. C. Grunewald, University City*** over Dry Branch and over Danger Creek, Lawrence Co., to Trinidad Asphalt Mfg. Co., 600 South Teresa St., St. Louis*** over Mill River, Newton Co., to Kelly & Underwood, Granby***in Polk Co., to J. A. Kerr, Ozark. **P.W.A.** Bids June 7. Rejected bids June 7, bridges in St. Louis and Jefferson Counties. Noted June 13, C. D.—May 23, E. N.-R.

★**Mo., St. Charles**—Wabash Railway Co., E. L. Crugar, ch. engr., and Wabash St. Charles Bridge Co., c/o Receivers Wabash Ry.-Railway Exch. Bldg., St. Louis, Contr. 3, completing superstructure for single track railroad bridge over Missouri River between St. Charles and St. Louis Counties, to American Bridge Co., 506 Olive St., St. Louis, and Mount Vernon Bridge Co., Mount Vernon, Ind., $1,041,098. **P.W.A.** Bids June 12. Noted June 17, C. D.—May 23, E. N.-R.

★**New York**—Henry Hudson Parkway Authority, c/o Dpt. Parks, Arsenal Bldg.,

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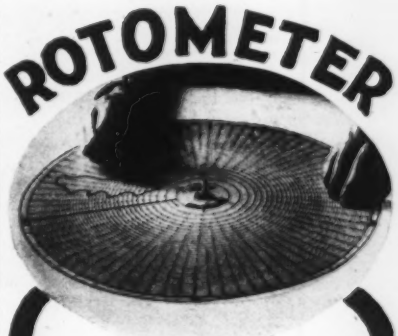
ROTOMETER



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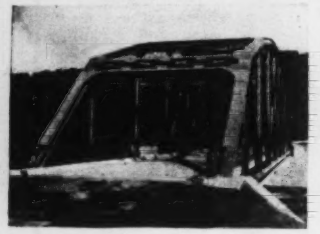

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Bridges, etc. (Continued)

Central Park, New York, superstructure of Henry Hudson Bridge from Inwood Hill Park, Manhattan Boro, to Harlem River Ship Canal, Spuyten Duyvil, Bronx Boro, to American Bridge Co., 71 Bway., New York, $865,209; substructure for same to Thomas Crimmins Contg. Co., 734 Lexington Ave., New York, $272,669. **P.W.A.** Bids June 14. Noted June 17, C. D.—May 30, E. N.-R.

N. Y., Buffalo—See "Streets and Roads."

Pa., Pittsburgh—City, Dr. J. P. Kerr, controller, City County Bldg., repairing and repaving Manchester Bridge at point, to M. O'Herron Co., South 20th and McKean Sts., $23,402. Est. $25,000. Bids June 11. Noted June 18, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, constructing Gulf Colorado & Santa Fe R.R. underpass, Hy. 74, NRM 611 E, Miles Co., to Allhands & Davis, Southwestern Life Bldg., Dallas, $59,523 est. $60,000***Brushy-Elm Creek Bridge and approaches, Hy. 5, NRM 595-E, Cooke Co., and widening St. Louis and South Western R.R. underpass, West Erwin St., Tyler, Hy. 64, NRM 115-C, Smith Co., to R. B. Butler, Box 1023, Bryan, $19,284 and $15,533 respectively, est. $20,000 each. Grand total $94,340. **P.W.A.** Bids June 10. Noted June 14, C. D.

West Virginia—See "Streets and Roads."

N. B., Fredericton — Hon. D. A. Stewart, minister P. Wks., New Brunswick, constructing Christopher Bridge, to Olts & McNabb, Fredericton, $13,000; constructing Taymouth Bridge, to Luther B. Smith, West St. John, $16,000. Noted Apr. 11, C. D.—Apr. 18, E. N.-R.

STREETS AND ROADS

BIDS ASKED

†**Arizona**—July 11, by Pub. Rds., Phoenix, grading 3.5 mi. Flagstaff-Clint's Well Rd., Coconino Natl. Forest, Coconino Co.

California — July 11, by State Hy. Comn., State Bldg., Los Angeles, grading, concrete paving 5.6 mi. hy. and widening 2 bridges, on hy. between Little Sycamore and Encinal Canyons, Los Angeles and Ventura Counties, C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

California—State Hy. Comn., State Bldg., Los Angeles, cancelled bids to have been opened June 27, grading, asphaltic concrete or concrete paving 2.1 mi. Cerritos Ave. between Los Angeles St. and Artesia Ave., Los Angeles Co. C. H. Purcell, 808 State Bldg., Los Angeles, engr. Will re-advertise. Noted June 10, C. D. —June 13, E. N.-R.

California—C. H. Purcell, engr. State Hy. Dpt., State Bldg., Los Angeles, cancelled bids to have been opened June 20 for grading, liquid asphalt treating 33.5 mi. hy. Vidal to point 6 mi. north of Blythe, Riverside and San Bernardino Counties. Will readvertise. Noted June 5, C. D.

Kentucky — July 8, by State Hy. Comn., Frankfort, high type surfacing 1.127 mi. Main and 4th Sts., Covington, NRM 141, ES, Kenton Co. (bids for same were to have been opened June 21, but withdrawn); grading, draining 2.193 mi. Artemus-Kayjay Rd., NRS 355 AG, Knox Co.

La., Shreveport—July 18, by Caddo Parish Police Jury, grading 1.453 mi. Providence Hy., Unit 12., Sec. 2; grading, bridging, gravel surfacing 4.162 mi. Buncombe-Bethany Hy., Unit 3, Sect. 2; 1.904 mi. 70th St. Road, Unit 9, Sect. 6; gravel surfacing 1.655 mi. Wells Island Rd., Unit 5, Sect. 4; 4.33 mi. Forbing Red Bluff Hy., Unit 10, Sect. 5; 2.495 mi. Yarwood Rd., Unit 11, Sect. 5; 2.781 mi. Keithville-Keatchie Rd., Unit 6, Sect. 5; 6.445 mi. Blanchard-Dixie Rd., Unit 15, Sect. 8. P.W.A. project.

Md., Easton—July 10, by Mayor and Council, tar or asphalt macadam paving 2,460 sq.yd. roadway on South St., and resurfacing 4,320 sq.yd. existing macadam pavements on August St. E. G. Kastenhuber, Jr., town engr.; adv. E. N.-R. June 27.

Mass., Medford — See "Sewerage and Waste Disposal."

Mass., Medford—July 2, by City, J. C. Gillis, street comr., bituminous macadam paving various streets. $200,000 appropriated. H. J. Nicholson, city engr. Noted May 7; C. D.—May 9, E. N.-R.

†**Mississippi**—July 11, Pub. Rds., at office Superintendent Vicksburg Natl. Military Park, grading, drainage structures, concrete or asphaltic pavement on concrete paving 1.5 mi. Project 1A1, incl. 45,000 cu.yd. excav. H. J. Spelman, dist. engr.

N. Y., Buffalo—July 5, by G. Summer, City Hall, prepaving Prospect and Crescent Aves., Balcom, Arnold, Hunt, Jersey Sts., for City. A. Mockler, city engr.

N. Y., Buffalo—See "Contracts Awarded."

N. Y., Wingdale—July 17, by Dpt. Mental Hygiene, State Office Bldg., Albany, constructing roads and grading at Harlem Valley State Hospital.

Okla., Newkirk—See "Contracts Awarded."

Pa., Pittsburgh—July 2, by R. G. Woodside, controller Allegheny Co., joint improvement of 4,993 ft. Cochran Rd. from Bower Hill to Mt. Lebanon Twp., to Washington Pike, Scott Twp. $100,000. Bids June 4 rejected. Noted June 10, C. D.—May 30, E. N.-R.

Wyoming—July 16, by State Hy. Com., Capitol Bldg., Cheyenne, grading, draining, facing 2 treated timber bridges and 1 con. culvert on 5.167 mi. Laramie-Woods Landing Rd., Albany Co., incl. 71,500 cu.yd. classified excav.; 240 cu.yd. excavation in culverts; 0.8x5 mi. sidewalk on Cheyenne-Sou. and Cheyenne Laramie Rds., Laramie Co., 6,7 cu.yd. unclassified and 309 cu.yd. special ex.

Ontario—July 3, by R. A. Campbell, deputy minister, Dpt. Northern Development, Toronto, improving and grading section of Trans-Canada Hy. between Diment and Vermillion Bay, each project 30 mi. long, Contrs. DV 1, DV2; clearing, stumping, grading, section of Trans-Canada Hy. betweeen White River and Schneiber, each project being 21 mi. long, Contrs. SW1, SW2, SW3, SW4, SW5.

Quebec—July 2, by Dpt. Roads, Government Bldg., Quebec, clearing earthworks, constructing culverts and graveling 10 mi. Sect. Fabre-Temiskaming Rd. from Laniel to Tabaret, Tabaret Twp.

Que., St. Hyacinthe—See "Contracts Awarded."

CONTRACTS AWARDED

Alabama — State Hy. Dpt., Montgomery, grading, draining 1.818 mi. Florence-Athens Rd., Lauderdale Co., NRH 66, to Beckham-Lawler and W. C. Shepard, 347 Elizabeth St. N. E., Atlanta, Ga., $88,201***clearing, grubbing, single bituminous surface treating with cold asphalt seal coat 1.131 mi. Haynesville-Letohatchee Rd., Lowndes Co., NRS 353, to Hardaway Contg. Co., Georgia Home Bldg., Columbus, Ga., $20,684***grading, bridging, concrete paving 1.191 mi. Eutaw-Tuscaloosa Rd., Greene Co., NRH 361-A, to M. J. Carroll Co., Ocala, Fla., $61,085. Grand total $169,970. Bids June 6. **P.W.A.** Noted June 13, C. D.

Arizona—State Hy. Comn., Phoenix, grading, draining, and aggregate base course and road oil mix over 10.3 mi. Ajo-Tucson Hy., NRS 110-B, to Borderland Constr. Co., Tucson, $125,209. **P.W.A.** Bids May 15. Noted May 21, C. D.—May 2, E. N.-R.

Arizona — State Hy. Comn., Phoenix, improving Phoenix-Yuma Hy., NRM and NRH 30-D, to R. C. Tanner & W. E. Hall Co., 312 South 11th Ave., Phoenix. **P.W.A.** Bids May 15. Noted May 21, C. D.—May 2, E. N.-R.

California — C. H. Purcell, engr. State Hy. Dpt., State Bldg., Los Angeles, grading, concrete or asphaltic concrete paving 1.4 mi. hy. from Anaheim to Miraflores, Orange Co., to C. O. Sparks, 2309 East 9th St., Los Angeles, $39,435. Bids May 23, awarded June 11. Noted May 24, C. D.

Connecticut—State Hy. Comn., Hartford, J. A. Macdonald, state hy. comr., waterbound macadam paving 22,712 ft. Hill Rd., Harwinton, to Oneglia & Gervasini, Inc., Torrington, $145,883***13,778 ft. Wagner's Corner Rd., Salisbury, to John De Michele & Bro., Inc., 58 High St., Torrington, $92,157***19,529 ft. Pierce Hollow and Strongtown Rds., Southbury, to Silliman & Godfrey Constr. Co., 133 Admiral St., Bridgeport, $112,997***bituminous material surfacing (3 types) 20,550 ft. Cheshire-South Meriden Rd., Cheshire and Meriden, to Guyott Contg. Co., 15-17 Haven St., New Haven, $14,244. Grand total $365,281. **P.W.A.** Bids June 3. Noted June 6, C. D.

Ill., Cambridge—Dpt. P. Wks. and Buildings, Div. Hys., concrete paving 4.2 mi. Section 15-15d. to Central Eng. Co., Davenport, $71,879. Bids June 7. Noted May 27, C. D.—May 30, E. N.-R.

Ill., Waukegan—Dpt. P. Wks. & Buildings, Div. Hys., concrete paving 1.0845 mi. Sect. 65-15d. near Round Lake, Lake Co., to E. A. Meyer Constr. Co., Highland Park, $32,218. Bids May 16.

Indiana — State Hy. Comn., Indianapolis, rein.-con. and rock asphalt repaving 0.859 mi. State Rd. 2, in LaPorte, to McAfee & Smith, Bluffton, $46,771. Est. $50,890. Bids May 21.

Iowa—State Hy. Comn., Ames, to Ferguson Diehl Constr. Co., Grand Junction, graveling 1.65 mi. Buena Vista Co., $542; maintenance resurfacing roads in Buena Vista Co., $9,063; Pocahontas Co., $10,735***to Martsell & Evans, Early, graveling 5.04 mi. Dickinson Co.; $2,092; maintenance resurfacing road in Crawford Co., $3,915; Monona Co., $7,837; road in Ida Co., $6,549; road in Plymouth Co., $6,096; road in Sioux Co., $321; road in Woodbury Co., $8,119; road in Sioux Co., $11,442; road in Lyon Co., $11,437; road in O'Brien Co., $2,246; road in Osceola Co., $1,004***to Maudlin Constr. Co., Nevada, graveling 5.1 mi. Woodbury Co., $2,522; maintenance resurfacing roads in Cherokee Co., $2,346; Monona Co., $1,313; O'Brien Co., $2,318; Osceola Co., $3,393; Woodbury Co., $3,132***to Hargrave Constr. Co., Cedar Rapids, second course bituminous surfacing 8.6 mi. road in Cedar and Johnson Counties, $13,918; 4.2 mi. Fayette Co., $7,083; 5.5 mi. Grundy Co., $8,688; 1.6 mi. Grundy Co., $2,605; 5.1 mi. Marion Co., $7,651; 9.8 mi. Marion Co., $14,038; 5.6 mi. Mitchell Co., $9,340; 2.2 mi. Mitchell Co., $3,551***to J. A. Huff, Armstrong, maintenance resurfacing roads in Dickinson Co., $3,332; Palo Alto Co., $1,295 ***to Northwestern Gravel Co., Lake View, roads, in Ida Co., $706; Sac Co., $6,211. Grand

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†*Federal Government.*

Streets and Roads (Continued)

total $174,340. Bids June 18, awarded June 19. Rejected bids June 18, bituminous surfacing 5.9 mi. road in Pottawattamie Co. Noted June 11, C. D.—June 13, E. N.-R.

Ia., Washington—Washington Co., graveling 12.438 mi. and 30.74 mi. maintenance gravel, to E. D. Wahl, Victor, $31,672; 18 box culverts and extensions, to G. H. Lowe, Cedar Rapids, $11,794. Bids June 14, awarded June 17. Noted June 4, C. D.—June 6, E. N.-R.

†La., Chalmette—Pub. Rds., Dpt. Agriculture, at office Acting Supt. Vicksburg Natl. Military Park, constructing Project 1A1, Chalmette Natl. Park, to Brockman & Walker, 204 Camp St., New Orleans, $57,403. Bids June 4. Noted June 10, C. D.—May 26, E. N.-R.

Massachusetts — Commonwealth of Massachusetts, Metropolitan Dist. Comn., B. R. Davis, ch. engr. Parks Div., 20 Somerset St., Boston, bituminous macadam paving Middlesex Fells Parkway, Fellsway East from Pleasant to Savin Sts., Malden and Charles River Rd. from Station 26-65 to Beacon Sq., Watertown, to Simpson Bros. Corp., 193 Hanover St., Boston, $24,000 and $23,900 respectively. Bids June 6, awarded June 14. Noted June 11, C. D.

Missouri—State Hy. Comn., Jefferson City, to Cook & Cone, Ottawa, Kan., oil graveling 4.96 mi. Napoleon-Bates City Rd., Sect. 1A, $6,326; 4.992 mi. Sect. 2A, same road, $6,409, both Lafayette Co.; 5 mi. Galt-Harris Rd., Sect. 2C, $1,983; 3.996 mi. Sect. 3B, same road, $1,766, both Sullivan Co.***to Land Constr. Co., St. Joseph, 2.698 mi. Spickard Rd. West, Sect. 2A, $4,235; 4.801 mi. Sect. 1A, same road, $7,428, both Grundy Co.***to Granite Bituminous Paving Co., Railway Exch. Bldg., St. Louis, bituminous surface treating 3.52 mi. Stoddard Co., $24,160; 4.894 mi. Campbell North and South Sect. 40A, $1,642; 4.194 mi. Sect. 41A, same road, $1,546, both Dunklin Co.***to Nevada Constr. Co., Nevada, 3.667 mi. Versailles Rd. east and west, $5,574; 4.15 mi., same road, Sect. 42B, $6,466, both Morgan Co. ***to Rock Hill Asphalt & Constr. Co., LaDue Rd., St. Louis, 1.426 mi. Cape Girardeau Rd. S., Sect. 1B, $972; 4.513 mi. Sect. 25C, $3,048; 4.57 mi. Sect. 26C, $3,056; 1.383 mi. Sect. 28B, same road, $466***to R. E. Brown, Cape Girardeau, grading, graveling 2.401 mi. Irondale-Leadwood Rd., Washington Co., $4,931*** to C. H. Atkinson Paving Co., Chillicothe, shoulder widening 1.013 mi. Grundy Co., $6,201***to Trinidad Asphalt Mfg. Co., St. Louis, grading 0.274 mi. Lawrence Co., $8,903 ****to Kuhn & Pyle, Pattonsburg, crushed stone surfacing 4.13 mi. in Mercer Co., $1,459*** to R. Zink, appleton, graveling 2.303 mi. Powersville-Iowa Line Rd., Putnam Co., $4,597 ***to Cooley Gravel Co., Chillicothe, clay surfacing 9.83 mi. Nodaway Co., $19,219. Grand total $120,388. **P.W.A.** Rejected bids June 7, improving roads in St. Louis Co. Bids June 7. Noted June 13, C. D.—May 23, E. N.-R.

★ **N. Y., Buffalo**—City, widening and straightening Delaware Ave., replacing bridges, etc., day labor, $500,000. ERB project.

N. Y., Oneonta—Dpt. Health, State Office Bldg., Albany, roads, walks, grading at state tuberculosis hospital, to J. Belotte & Sons Co., 2317 15th St., Troy, $28,581. Bids May 28. Noted June 3, C. D.—May 30, E. N.-R.

Ohio — **J. Jaster, Jr., dir. hys., Columbus,** grading, drainage structures, traffic bound macadam surface course paving 1.192 mi. Sect. "Muskingum Watershed Conservancy Dist." road relocation, Mifflin-Lucas Rd., Vermilion Twp., Ashland Co., to D. Kissling, Bucyrus, $12,264***hot mixed, hot laid, asphaltic concrete paving 0.497 mi. Sect. "Hamilton" Hamilton-Eton Rd., Butler Co., to Andrews Asphalt Paving Co., Hamilton, $55,873***concrete paving 0.416 mi. Sect. "A" Napoleon-Defiance Rd., Defiance Co., to Launder & Son, Box 52, Station "E", Toledo, $18,891***grading, constructing drainage structures, constructing curves, inlets and cold mixed asphaltic concrete paving 0.586 mi. Sect. "Sandusky" Columbus-Sandusky Rd., Erie Co., to Thompson Paving & Constr. Co., 14232 N. Haven Ave., Toledo, $51,398***traffic bound surface course paving 0.331 mi. Sect. "D" Steubenville-Cambridge Rd., Harrison Co., to Hamer Bros., Greenville, $9,013 ***traffic bound surface course, 45 ft. span concrete beam bridge over Bundin's Run, Sects. "O" and "T", Pomeroy-Jackson Rd., Jackson Co., to George A. Stein Constr. Co., Niles, $15,819***concrete paving 0.327 mi. Sect. "M" Cleveland-East Liverpool Rd., Mahoning Co., to Erie Contg. & Excavating Co., 990 Paxton Rd., Cleveland, $18,598***grading, landscaping, concrete paving 0.294 mi. Sect. "B" (E. and O. R.R. Subway), Miami Co., to J. Frantz & Sons, Sidney, $15,308***grading, draining, brick paving 0.421 mi. Sect. "Niles" Niles-Ashtabula Rd., Trumbull Co., to J. De Jute, 337 Robins St., Niles, $59,359***grading, traffic bound surface course paving 0.312 mi. Sect. "Muskingum Watershed Conservancy Dist." Rd. Relocation, New Philadelphia-Zoarville Rd., Tuscarawas Co., to M. B. Duran, 1075 River St., Akron, $8,504. Grand total $265,027. Bids June 7, awarded June 10, subject to Federal approval. Noted June 13, C. D.

O., Cincinnati—City Manager, grading, draining, walks, curbing, sewers, concrete repaving 9,160 sq.yd. Cummins St. from Beekman to Carll Sts., to Byrnes-Conway Co., 19 Bank St., St. Bernard, $84,401. Est. $99,132. Bids June 4. Noted June 11, C. D.

†Federal Government.

Oklahoma—State Hy. Comn., Oklahoma City, concrete paving 0.425 mi. NRM 271C, Caddo Co., 40 ft., to Ryan-Richards, Inc., 1801 East 9th St., Oklahoma City, $31,300. Est. $31,296. **P.W.A.**

Okla., Newkirk — City, sidewalks on 4 mi. Main, Santa Fe, 9th, 8th and 6th Sts., day labor, $30,000. J. S. Clark, Newkirk, engr.

Pa., Franklin — Comrs. Venango Co. and various Township Supervisors, 8,050 ft. stone base road, Victor Twp., $7,500***7,500 ft. stone base road and extensions, Rockland Twp., $21,000; ¼ mi. stone base road, Pinegrove Twp., $2,300; 5 mi. stone base road Plum Twp.; improving 37¼ mi. dirt roads, Richland Twp., day labor. Township Engineers and Venango Co. Engineers, engrs.

Pa., Pittsburgh—City, to M. O'Herron Co., South 20th and McKean Sts., Repaving Forbes St. from 6th Ave. to Stevenson St., $42,804 est. $47,000; widening Carson St. E. from South 10th to South 17th Sts., $12,583 est. $15,000; sewer McCaslin St., $2,305***to J. M. McDonough, 656 Morgan St., recurbing, etc., Warrington Ave., $9,437***to Kelly Constr. Co., 340 Boquet St., house laterals McCaslin St., $802***to Harrison Constr. Co., 1101 Western Ave., grading, paving, curbing, laying water lines in McCaslin St. from Greenfield to Bigelow Sts., $37,740 est. $46,000. Grand total $105,671. Bids June 11. Noted June 17, C. D.

Pa., Washington — **J. L. Post,** controller Washington Co., slag resurfacing Prosperity-Dunnstation, Pike Run, McMurray and other roads, to Hull Resurfacing Co., Butler, $76,359. Bids June 5. Noted May 24, C. D.—May 30, E. N.-R.

South Dakota — State Hy. Comn., Pierre, to W. H. Noel Co., Jamestown, N. D., grading 6.002 mi. Project NRS 377, Faulk and Hand Counties, $24,618; 0.046 mi. NRS 381, Day Co., $26,186***to Smith & Marlin, Gering, Neb., 9.884 mi. NRS 378, Brown Co., $36,712 ***to Jarvis, Wright & Howell, Sioux Falls, 8.115 mi. NRS 385, Bon Homme Co., $30,653; 7.053 mi. NRS 389, Turner Co., $15,429*** to S. E. Gustafson, Beresford, 1.921 mi. NRS 390A, Union Co., $7,781***to J. L. Healy Constr. Co., Manchester, 9.583 mi. NRH 3, Grant Co., $12,849; 12.498 mi. F.A.P. 133 and 93, Miner Co., $11,447; 29.893 mi. F.A.P. 173A, B and C, Faulk Co., $11,481***to North Western Eng. Co., Rapid City, 7.28 mi. NRH and M 15A, Lawrence Co., $12,623; gravel resurfacing 8.25 mi. F.A.P. 214A, Butte Co., $6,688; 12.845 mi. F.A.P. 245, Fall River Co., $11,060***to W. R. Lindekugel, Spencer, 5.039 mi. F.A.P. 50A, Sanborn Co., $3,861***to F. Schuknecht, Parker, 2.946 mi. F.A.P. 62, McCook Co., $1,868; 21.63 mi. F.A.P. 196A and 104, Aurora and Douglas Counties, $11,493; 14.879 mi. F.A.P. 197A and part of 102, Minnehaha and Lincoln Counties, $6,077***to Hector Constr. Co., Hector, Minn., 25.167 mi. F.A.P. 208 B and C, Roberts Co., $14,247; 9.92 mi. NRH 122, Deuel Co., $4,227***to M. Joyce, Brandon, 15.067 mi. F.A.P. 265A and 27B, Lyman and Tripp Counties, $7,067 ***to Philip Constr. Co., Philip, 14.13 mi. F.A.P. 265B, part C, Tripp Co., $9,287*** to Richards & Richards, Sorum, 1,180 lin.ft. guard rail NRH 3, Grant Co., $337; 2,010 lin.ft. NRS 288, Sanborn Co., $563. Grand total $226,554. **P.W.A.** Noted May 29, C. D.—June 6, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, grading, drainage structures, limestone rock asphalt on concrete paving 0.265 mi. State Hy. 2, N.R.M. 8-C, Travis Co., to S. & H. Constr. Co., 318 Milam Bldg., San Antonio, $39,167 est. $40,000***concrete paving 6.656 mi. State Hy. 34, N.R.S. 672-D, Ellis Co., to Briggs-Spence Co., 3553 Rankin St., Dallas, $137,481 est. $160,000, both P.W.A. projects***grading, drainage structures 2.228 mi. State Hy. 40, State Project 493-B, Angelina Co., to J. S. Moore & Sons, Lufkin, $25,243 est. $20,000. Grand total $201,891. Bids June 10. Noted June 14, C. D.

†Utah—P. Rds., Ogden, grading, draining, surfacing 2.581 mi. Salt Lake Co., to B. D. Palfreyman, Provo, $44,533 est. $44,287; 8.743 mi. Kane and Garfield Counties, to Reynolds Ely Constr. Co., Springville, $58,475 est. $51,545. Bids May 28. Noted May 21, C. D.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, crushed stone mixed in place paving 1.9 mi. Project NRH 63-G, Wilmington, to State Constr. Co., 353 Washington St., Brighton, Boston, Mass., $84,729. **P.W.A.** Bids June 7, awarded June 14. Noted June 11, C. D.

Washington—State Hy. Dpt., Olympia, improving 8.638 mi. Kitsap and Mason Counties, to Independent Asphalt Paving Co., 914 Seaboard Bldg., Seattle, $57,179***66.3 mi. Lincoln, Spokane and Grand Counties, to F. R. Hewett, 420 West 22nd St., Spokane, $10,545 ***4.424 mi. road in Snohomish and Skagit Counties to L. J. Dowell, Inc., 1437 Elliott Ave. W., Seattle, $78,006***1.334 mi. Okanogan Co., from J. C. Wachter, Co., Stevenson, $31,143***38.8 mi. Kittitas Co., to J. F. Forbes, 110 East Union St., Olympia, $68,647 ***6.434 mi. Whitman Co., to Clifton & Applegate, and G. K. Lyon Co., Hutton Bldg., Spokane, $128,870. Grand total $465,389. Bids June 11. Rejected bids June 11, road in Kitsap Co. Noted May 28, C. D.

West Virginia—State Rd. Comn., Huntington, improving roads in Fayette Co., to Abbott Constr. Co., Charleston, $9,330***Marshall Co., to G. H. Plants & Co., Madison, $6,492***

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BLACK TOP ROAD BUILDING EQUIPMENT

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"SPEED-A-WAY" DISTRIBUTOR
Attached to any dump truck. Spreads forward or backing up—more accurately than any other spreader on the market.

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Spreads hot or cold bituminous mixes, or dry aggregate, giving the required depth and crown.

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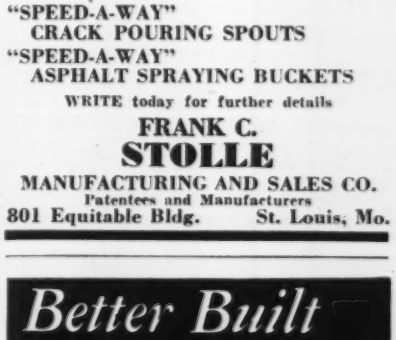

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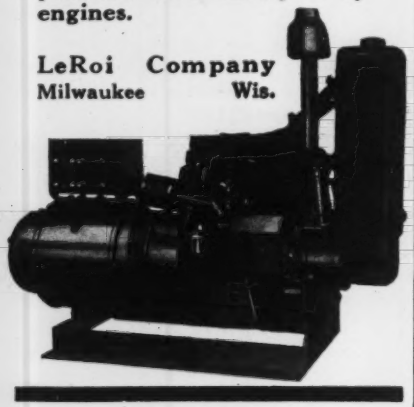

LeRoi Company
Milwaukee Wis.

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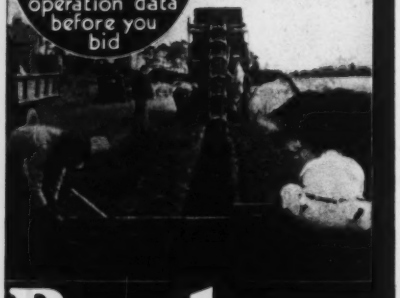
ask for our operation data before you bid



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MODEL 160 DITCHER
DIGS 75% OF ALL DITCHING JOBS
Any trench from 16 in. to 42 in. wide up to 12 ft. 6 in. deep. Digging speeds range from 6 in. to 135 in. per minute.
THE BUCKEYE TRACTION DITCHER CO
FINDLAY, OHIO

Streets and Roads (Continued)

bridge in Ohio Co., to A. V. Williams Co., Martens Ferry, O., $38,012. Grand total $53,833. Bids June 18. Noted June 7, C. D.—June 13, E. N.-R.

Wisconsin—State Hy. Comn., Madison, bituminous surfacing 3.751 mi. roads in Oneida Co., to Eau Claire Sand & Gravel Co., Eau Claire, $27,831; 1.259 mi. Monroe Co., to Clarence Berg, Campbellsport, $6,240. P.W.A. Bids June 11. Noted June 17, C. D.—May 30, E. N.-R.

Ontario—Dpt. Hys., Toronto, surface treatment on 42 mi. Contr. 35-10, Port Hope, to A. E. Jupp Constr. Co. Ltd., 170 Berkeley St., Toronto***surface treatment on 42 mi. Contr. 35-11, Brockville, and application of oil dust layer on 54 mi. Contr. 35-13, Peterborough east to Actinolite, to Henniger & Scott, Smiths Falls.

Ont., Ottawa — City, asphalt on concrete paving track allowance on Sparks St. from Elgin to Bank Sts., to Standard Paving Ltd., Central Chambers, Elgin St., $26,855; and Somerset St. from Booth St. to Somerset St. Bridge, to O'Learys Ltd., Bank National Bldg., $11,185.

Ont., Toronto—City, asphalt paving Parkside Dr. from Queen St. to Bloor St., Sect. A, to Law Constr. Co. Ltd., 225 Sterling Rd., $26,998***Sect. C., to Ryan Contg. Co. Ltd., 60 Front St. W., $34,339***asphalt paving Strachan Ave. over C. P. R. and C. N. R. tracks, to Constr. & Paving Co., Fleet St. W., $1,660. Grand total $62,997.

★ **Quebec**—J. L. Boulanger, deputy minister Dpt. Roads, Quebec, clearing, grading and gravel surfacing 60 mi. road between Rouyn and Louvicourt, to F. Dorval, Amos, A. Ray, Amos, W. A. McCarthy, Quebec, E. Moini and B. & P. Belonger, Sayabeck, $275,000*** surfacing 40 mi. section of highway between Maninaki and Mont Laurier, to Belmont Constr. Co. Ltd., Montreal***surfacing, grading 55 mi. 2nd section same highway south from point 17 mi. from Senneterre, to Massicothe & Trudel, Montreal, $400,000***clearing, grading, gravel surfacing 15 mi. road from Lacorne to Sullivan gold mines, to Societe d'Enterprise General, Montreal, about $100,000. Grand total $775,000. Noted May 20, C. D.—May 23, E. N.-R.

★ **Que., Quebec City** — City, waterbound macadam paving 40 mi. Manawaki-Senneville Hy., to Belmont Constr. Co. Ltd., Montreal, $200,000***55 mi. Sanneville-Mount Laurier Hy., to Massicotte & Trudel, Quebec City, $200,000***60 mi. Royn-Laornicourt Hy., to Frank Dorval & Co., Amos, $275,000***15 mi. Lacorne-Sullivan Mine Hy., to Societe d'Enterprise Generale, Quebec City, $100,000, all roads 30 ft. wide. Grand total $775,000.

Que., St. Hyacinthe—Municipality, constructing new pavements on several streets, day labor, $25,000 voted.

Que., Sherbrooke—City paving Big Forks St., to Bonin, Gendrow & Poudrier Ltd., Sherbrooke, $23,000.

EARTHWORK, IRRIGATION DRAINAGE AND WATERWAYS

PROPOSED WORK

Ariz., Chandler—Chandler Heights Irrigation Dist., Chandler, plans constructing irrigation water and power facilities, incl. pipe lines, well, power plant and transmission lines. $94,000. P.W.A. loan approved. Noted Jan. 17 C. D.—Jan. 25, E. N.-R.

Calif., Los Angeles—Metropolitan Water Dist., 306 West 3rd St., F. E. Weymouth, engr., preliminary work 5 aqueduct pumping plants to be operated by power from Boulder Dam; preliminary work on Cajalco Dam, 6 mi. south of Riverside, to be ¼ mi. long, 190 ft. high, earth fill, involving 7,300,000 cu.yd., to be used as terminal reservoir for the aqueduct; preliminary work on 150 mi. of initial aqueduct distributing pipe lines for delivery of water from Cajalco Reservoir, to each city member of the district. R.F.C. has agreed to purchase $36,000,000 of District's bonds to finance construction of above including 237 mi. transmission line, between Boulder Dam power plant and Colorado River Aqueduct.

Calif., Newport Beach — Irvine Co., Tustin, made application to War Department for permit to dredge 190,000 cu.yd. material from areas near present channel in Newport Harbor and to deposit same in adjacent authorized areas. $25,000. H. H. Stickney (major), 751 South Figueroa St., U. S. engr.

†**Me., Corea**—U. S. Eng., Custom House, Boston, Mass., plans dredging 600 ft. x 400 ft. anchorage basin, 8 ft. deep, at Corea Harbor. $44,300.

Miss., Ocean Springs—Bd. Supervs. Jackson Co., Ocean Springs, made application to P.W.A. for $105,000 loan to finance construction of seawall.

Tenn., Chattanooga—City, M. Z. L. Fuller, chn. Chattanooga Flood Protection Comn., went to Washington to make application for $133,000 grant to complete preliminary surveys for building levees and dredging Tennessee River, vicinity of here, for flood control. Total est. $15,000,000 needed for actual construction will be borrowed against bonds. City has expended $6,053 of $10,000 appropriation in preliminary surveys. E. L. Chandler, 3813 Lerch St., engr. Noted Oct. 15, C. D.—Oct. 18, E. N.-R.

†**Wash., Bellingham** — U. S. Eng., Federal Bldg., Seattle soon takes bids removing 60,000 cu.yd. from Whatcom Creek Waterway, Whatcom Co. $21,000.

★ **Wash., Walla Walla**—Walla Walla Co. plans forming flood control district for flood control work and irrigatin, $800,000.

Wis., Milwaukee — City, plans repairing Menomonee River south dock wall between North 9th and North 12 Sts., $18,649, constructing new dock on the north bank of Burnham Canal, $46,384.

BIDS ASKED

†**Florida**—July 12, by U. S. Eng., Jacksonville, constructing Lock 2, Ortona with spillway structure, powerhouse, locktenders house and appurtenances, on Caloosahatchee Canal, about 15.5 mi. southwest of Moore Haven.

†**Missouri and Nebraska** — July 3, by U. S. Eng., Postal Telegraph Bldg., Kansas City, Mo., furnishing, constructing items for pile dikes and revetment, 2 mi. from Nemaha City, $682,261 or $416,496, alternates where government supplies mattress, lumber and piling.

★ †**Missouri and Nebraska**—July 5, by U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, Mo., constructing pile dikes, revetment, and abatis in Missouri River, at Hamburg Bend to Nishnabotna Bend, Otoe and Nemaha Counties, Neb. and Atchison Co., Missouri, 4 mi. downstream from Minersville, Neb. $620,592; also in Missouri River at Nishnabotna and Peru Bends, Nemaha Co., Neb. and Atchison Co., Mo., near Peru, Neb. $193,273.

†**Nev., Boulder City**—July 12, by Bureau Reclamation, Denver, Colo., mechanical apparatus for desilting basins at Imperial Dam and Desilting Works, All-American Canal System, Boulder Canyon Project. R. F. Walter, Denver, Colo., ch. engr.

†**O., Zanesville**—July 9 (extended date), U. S. Eng., 1st Natl. Bank Bldg., furnishing electric lighting fixtures, etc. at Tappan, Charles Mill, Wills Creek, Glendenning, Beach City, Mohawk, Senecaville, Piedmont, Mohicanville, Dover, Bolivar, Pleasant Hill, Leesville and Atwood Dams. Noted June 14, C. D.

†**Oregon-Idaho**—July 12, by Bureau Reclamation, Dpt. Interior, Denver, Colo., cast-iron and radial gates, gate hoists, miter and 2-way bevel gear sets, shaftings, railings, and miscellaneous metal work for South Canal, Sta. 0 to Sta. 736, Succor Creek Div., Owyhee Project, Spec. 696-D. R. F. Walter, ch. engr.

†**Oregon**—July 10, by U. S. Eng., 2nd Portland Dist., 627 Pittock Blk., Portland, furnishing, installing lock operating equipment at Bonneville, incl. upper and lower miter gates with complete operating machinery, 4 taintor valves with complete operating machinery, 6 floating mooring bitts, complete and floor plates and grating. Noted June 3, C. D.—June 6, E. N.-R.

†**Ore., Dunaway**—July 15, by Bureau Reclamation, Dpt. Interior, Ontario, Ore., constructing structures North Canal Laterals, Mitchell Butte Div., Owyhee Project, Oregon-Idaho, incl. 3,560 cu.yd. excav., Spec. 694-D.

†**Tenn., Knoxville** — July 8, by Tennessee Valley Authority, Knoxville, diamond drilling for foundation grouting, within a radius of ¼ mi. Norris Dam. C. H. Garity, dir. Purchases.

Tex., Edinburg — July 19, by Hidalgo Co. Water Impvt. Dist. 6, A. L. Cramer, pres., Edinburg, constructing 2 pumping plants, P.W.A. project. A. Tamm, Harlingen, engr.

†**Wyo., Casper**—July 22, by Bureau Reclamation, E. Mead, comr., Casper, constructing Seminoe Dam and power plant, Casper-Alcova Project, incl. 541,500 cu.yd. all classes open-cut excav.; 22,000 cu.yd. tunnel excav. Spec. 630.

Ont., Toronto—July 5, by Secretary Dpt. P. Wks., Ottawa, constructing 1,102 lin.ft. superstructure concrete wall and platform supported on substructure of interlocking steel sheet piling and timber sheet pile cutoff wall, involving 61,712 sq.ft. steel sheet piling, 98,800 lin.ft. round wood piles, 52,800 ft. B.M. timber sheet piling, 53,000 ft. B.M. timber, 108,000 lb. structural steel, 188,515 lb. anchor rods, etc., 24,680 lb. tie rods, 3,080 cu.yd. concrete in place, and 80,500 lb. reinforcing steel, $220,000. K. M. Cameron, Ottawa, engr.

CONTRACTS AWARDED

†**Connecticut**—U. S. Eng., Providence, R. I., breakwater at various points, to Bouler Constr. Co., 17 State St., New York, $68,267. Bids May 29. Noted June 4, C. D.—May 2, E. N.-R.

★ †**Louisiana** — U. S. Eng., New Orleans, 1,250,000 cu.yd. earthwork, to Jahnche Service, Inc., 814 Howard Ave., New Orleans, $145,755**2,650,000 cu.yd., to Dameron & Kenyon, Port Allen, $265,200***550,000 cu.yd., to Lewis Chambers Constr. Co., 801 Baronne Bldg., New Orleans, $86,515***105,000 cu.yd., to J. L. McWilliams, New Orleans Bank Bldg., New Orleans, $14,679. Grand total $512,149. Bids May 7, 28 and 31. Noted May 13, June 3 and 4, C. D.—May 16 and 23, E. N.-R.

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†*Federal Government.*

Earthwork, etc. (Continued)

†**Mass., Bourne**—U. S. Eng., Custom House, Boston, dredging in mooring basin in Cape Cod Canal, to Atlantic, Gulf & Pacific Co., 13 Park Row, New York, N. Y., $150,592. Bids June 7, awarded June 18. Noted June 11, C. D.

†**Neb., Boulder City** — Bureau Reclamation, Denver, Colo., special drainage fittings, drain pipe leaders and welded fittings, 1 header with branches for Arizona wing, and 1 header with branches for Nevada wing, for Boulder Power Plant, Boulder Canyon Project, to Lacy Mfg. Co., Washington St. Los Angeles, Calif., $9,640. Bids May 3. Noted May 15, C. D.—Apr. 18, E. N.-R.

†**New Jersey**—U. S. Eng., Custom House, 2nd and Chestnut Sts., Phila., Pa., dredging in Delaware River, to Atlantic Gulf. & Pacific, 15 Park Row, New York, N. Y., $150,944. Bids June 6. Noted June 4, C. D.

New York—Dpt. P. Wks., Albany, improving drainage channel and constructing Black Creek Dike, in Lenox and Sullivan, Madison Co., to Provo Bros. Co., West Hiawatha Blvd., Syracuse, $66,092. **P.W.A.** Noted June 7, C. D.—May 16, E. N.-R.

†**O., Pavonia**—U. S. Eng., 1st Natl. Bank Bldg., Zanesville, constructing levee and protection of footings Tower 52, near here, to W. E. Thomson, Greenville, Pa., $24,958. Bids May 29. Noted May 7, C. D.—May 9, E. N.-R.

Tex., Donna—Donna Irrigation Dist., Hidalgo Co., W. A. Weinert, pres. Bd. Directors, irrigation project, new concrete canal system, to R. W. Briggs Co., Pharr, $420,041. **P.W.A.** Bids May 10. Noted May 27, C. D.—Apr. 18, E. N.-R.

†**Wis., Trempealeau**—U. S. Eng., 614 Commerce Bldg., St. Paul, Minn., furnishing power, control, lighting system at Lock and Dam 6, in Mississippi River, to Harmon Electric Co., 724 South Cicero St., Chicago, Ill., $83,248. Bids May 17. Noted May 29, C. D.—May 9, E. N.-R.

N. S., Sydney—Dpt. P. Wks., Ottawa, Ont., dredging, to J. P. Porter & Sons Ltd., Montreal, Que. and St. Catharine's, Ont. $25,500. Est. $14,000.

Ont., Keewatin—Dpt. P. Wks., Ottawa, wharf reconstruction, to Macaw & Macdonald, 208 Scott Bldg., Winnipeg, Man., $13,889.

Que., Charlamagne—Dpt. P. Wks., Ottawa, One., dredging, to Les Chautiers, Manseau, Lee, Sorel, $14,816. K. M. Cameron, Dpt. P. Wks., Ottawa, Ont., engr.

Que., LaMalbaie — Secretary, Dpt. P. Wks., Ottawa, Ont., constructing wharf extension, to Hill and Sibbald Ltd., St. Catharine's, Ont., $24,433. Est. $39,000. Noted May 23, C. D.—May 30, E. N.-R.

Que., Sorel—Dpt. P. Wks., Ottawa, Ont., dredging, to Les Chautiers, Manseau, Ltee., Sorel, $25,520. K. M. Cameron, Dpt. P. Wks., Ottawa, Ont., engr.

UNCLASSIFIED

PROPOSED WORK

California — NATURAL GAS PIPE SYSTEM —Tulare Co. Bd. Supervs., Visalia, election July 10 to vote on formation municipal gas utility district to embrace cities of Corcoran, Tulare and Lindsay, for construction of 29 mi. general system, 1 mi. 6 in. mains, 4 mi. 4 in. and 24 mi. 2 in. mains, 1,400 services, 1,400 meters and regulators, and 7% contingency fund, Tulare, est. $132,680: 7 mi. of general system, 4 mi. 4 in. mains, 6¼ mi. 2 in. mains, 400 services, 400 meters, and regulators, 5% contingency fund, Corcoran, est. $32,025: 18 mi. general system, 1 mi. 6 in. mains, 13 mi. 2 in. mains, 1,200 services, 1,200 meters and regulators and 5% contingency fund, Lindsay, est. $96,140. H. L. Hinkel, Court House, Visalia, engr.

★ **Conn., Hartford** — AIRPORT ENLARGEMENT — City, Hartford Aviation Comn., Municipal Bldg., filed application for Federal grant for enlarging Brainard Field, incl. 2 new runways (North-South) and (East-West), that be kept free of snow, also lighting and drainage work. $750,000.

Conn., Storrs—POULTRY QUARTERS—Connecticut State College, State Bd. Educ., plans new quarters for National Egg Laying Contest. $25,000. State Bd. Finance appropriated $18,000 for same.

Florida — RAILWAY — Live Oak, Perry & Gulf R.R., J. S. Foley, pres., Foley, plans 10 mi. or more railway from Foley Junction to Swann, vicinity of Cook's Hammock. $64,000. I.C.C. approved project.

Ia., Des Moines — SWIMMING POOL — City Council plans swimming pool at Birdland Park. $68,000.

Kansas—OIL PROPERTIES DEVELOPMENT —El Dorado Refining Co., Wichita, plans developing oil properties, drilling, service buildings, Rooks County, east of Stockton. To exceed $30,000.

Kentucky—GAS PIPE LINE—United Carbon Co., Charleston, W. Va., plans 4 in. steel gas pipe line from Louisa to Rock Castle Gas fields, $20,000 or more.

La., Good Pine — DOCKS, etc. — Good Pine Lumber Co., Good Pine, plans replacing burned plant, incl. docks, kiln and saw mill, La Salle Parish. Architect not appointed. To exceed $28,500. $200,000 fire loss. **Maturity indefinite.** Architect not appointed.

Mass., East Boston (sta. Boston)—STORAGE TANKS—See "Industrial Buildings."

Mass., Milford—ATHLETIC FIELD—Town, J. H. Gardella, chn. Bd. Selectmen, Town Hall, plans constructing concrete, steel grandstands, grading, fencing, etc. Est. $84,000. P.W.A. project.

Mass., Plymouth—WHARF—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, rejected bids Apr. 9, creosoted pile and timber wharf and dredging docks. Noted Apr. 15, C. D.—Apr. 4, E. N.-R.

Mass., Worcester—RACE TRACK—Worcester County Greyhound Assn., N. P. Argento, 22 Longfellow Rd., plans dog racing track, incl. stands, etc. $35,000. R. C. Gorrani, 175 Green St., engr.

Minn., St. Paul—SWIMMING POOL—Sumerset Country Club, Dodd Rd. and Wentworth Ave., H. C. Klein, secy., plans constructing 35x65 ft., rein.-con. swimming pool. $15,000 up (not official). C. H. Johnston, 300 Robert St., St. Paul, archt.

Miss., Booneville—SWIMMING POOL—See "Sewerage and Waste Disposal."

Miss., Greenwood—TRANSMISSION SYSTEM —See "Waterworks."

Missouri — HYDRO-ELECTRIC PROJECT — Empire District Electric Co., c/o Cities Service, 60 Wall St., has been refused extension for time for constructing hydro-electric project on White River at Table Rock near Galena by Federal Power Commission and proceedings have been started to cancel license. $30,000,000. Noted Dec. 7, 1932, C. D.—Dec. 15, 1932, E. N.-R., under "Dams."

Mont., Great Falls — SWIMMING POOL — R. H. Reynolds and A. F. Conrad plan swimming pool at White Sulphur Springs. $30,000.

★ **Neb., Beatrice** — ELECTRIFICATION IMPROVEMENTS—Southeast Nebraska Public Power Dist., plans rural electrification improvement. $600,000. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, engrs. P.W.A. project. Noted Feb. 21, C. D.—Feb. 28, E. N.-R.

N. Y., Buffalo — ELECTRIC POWER PLANT —Niagara, Lockport & Ontario Power Co., Electric Bldg., plans extending transmission lines in rural sections of Cattaraugus and Genesee Counties. Private plans.

★ **N. Y., Buffalo**—ZOO—City, F. A. Coon, comr. Parks, City Hall, plans development program at Buffalo Zoo, incl. administration building, animal house, promenades, and other improvements. $750,000. R. J. Kinkel, c/o owner, archt.

N. Y., Elmira — SIGNAL SYSTEM — See "Bridges and Grade Crossings."

N. Y., Kingston—TRACT DEVELOPMENT— See "Commercial Buildings."

N. Y., Troy—GAS HOLDER—Hudson Valley Fuel Corp., 192nd St., made plans 2,000,000 cu.ft. gas holders, 128 ft. diam. and 168 ft. high, supported on concrete piles. $160,000. Bartlett Hayward Co., 200 Scott St., Baltimore, Md., engrs.

N. C., Middlesex—DAMS, etc.—S. E. Murray, Middlesex, plans 2 dams on Moccasin Creek, where Route 231 crosses it on Nash-Johnston Co. line, near here, also plans to build Grist mill, wood shop to be operated by water power and develop land as community center.

O., Mingo Junction—PLAYGROUNDS, etc.— Municipality plans playgrounds, recreation park and stadium. $75,000.

Okla., Ada—MAUSOLEUM—Dill Mausoleum Co. made preliminary plans mausoleum in city cemetery. $85,000. Private plans.

Tenn., Chattanooga — BROADCASTING STATION—Valley Broadcasting Services, Inc., Read House, denied application for air license by Federal Communications Comn. to construct broadcasting station. Noted Oct. 9, C. D.—Oct. 18, E. N.-R.

Wash., Spokane—TANKS—General Petroleum Corp., 310 Sansome St., San Francisco, Calif., plans bulk storage, incl. tanks. $40,000 or more.

Wash., Vancouver — DOCK — Port of Vancouver plans 1,000 ft. dock and 100x800 ft. warehouse. $200,000. E. F. Carter, Vancouver, resident engr. J. S. Metcalf, 105 West Adams City, Chicago, Ill., engrs.

Alta., Jasper Park — SWIMMING POOL — Dominion Parks Branch, A. C. Wright, supt., preparing plans and takes bids in July full sized swimming pool and plunge baths, superintendent's residence and caretaker's residence. $80,000.

BIDS ASKED

Calif., Los Angeles—TELEPHONE TRUNK LINE—July 11, by Directors Metropolitan Water Dist., 306 West 3rd St., F. E. Weymouth, engr., constructing 6.2 mi. telephone trunk line, from point near Shaft 4 of Valverde Tunnel to point near outlet from proposed Cajaloo Reservoir. To exceed $17,750.

★ **Calif., Los Angeles**—TRANSMISSION LINE —Aug. 20, by Metropolitan Water Dist. of Southern California, 306 West 3rd St., F. E.

†*Federal Government.*

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CONTINUOUS, dependable service, large output, and economy of operation have been long proved by Bucyrus-Erie dredges. It was in 1883 that this organization built their first dipper dredge — a wood-hull, steam-driven, ½-yard machine, digging to a depth of fifteen feet. The present-day Crest, above, owned by Great Lakes Dredge and Dock Company, uses dippers to 16 yards and digs to 52 feet. (The Crest's 1440 h.p. Diesel develops a maximum bail pull of 350,000 pounds.)

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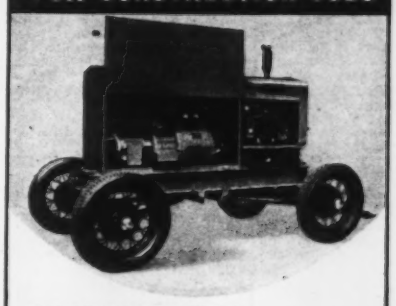

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4404 W. National Avenue,
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P&H HANSEN ARC WELDERS

Unclassified (Continued)

Weymouth, engr., 237 mi. high tension 230-kv. transmission line between Boulder Dam power plant and Colorado River Aqueduct pumping plants designated as Iron Mountain, Eagle Mountain, Hayfield and Gene, Schedule 1, with hollow copper conductors, District to furnish steel for towers in accordance with District's design; Schedule 2, with steel reinforced aluminum conductors, District to furnish steel for towers; Schedule 3, with hollow copper conductors, contractor to furnish steel for towers, in accordance with Contractor's Design; Schedule 4, with steel reinforced aluminum conductors, contractor to furnish steel for towers in accordance with contractor's design. Noted June 6, C. D.—June 13, E. N.-R.

Louisiana — OIL PROPERTY DEVELOPMENT, etc.—See "Contracts Awarded."

N. Y., Rochester—GAS MAINS—See "Contracts Awarded."

Wyo., Medicine Bow — OIL DEVELOPMENT —See "Contracts Awarded."

N. B., Lower Caraguet—WHARF REPAIRS—July 3, by Secretary Dpt. P. Wks., Ottawa, Ont., 1,300 lin.ft. wharf repairs, 25,000 cu.yd. cribwork, fully ballasted; 1,000 cu.yd. stone ballast; 30,000 ft. B.M. round timbers; 14,000 ft. B.M. used covering; 130,000 ft. B.M. square timbers, 81,000 ft. B.M. creosoted hardwood covering, $25,000. K. M. Cameron, Dpt. P. Wks., Ottawa, Ont., engr.

CONTRACTS AWARDED

Calif., San Francisco — AIRPORT — P. Utilities Comn., City Hall, constructing field fill for extension of landing field at San Francisco Municipal Airport, San Mateo Co., involving 240,000 cu.yd. fill, 50,000 cu.yd. rock surfacing, 20,000 cu.yd. remove old levee. Contr. 34, for City and San Francisco Co., to Piombo Bros. & Co., 1571 Turk St., $123,880. Noted June 11, C. D. Bids June 5, awarded June 11.

Conn., Thompsonville—GAS MAIN—Northern Connecticut Power Co., 15 Center St., 12 mi. gas main from Hartford to Thompsonville, to provide gas requirements of the Northern Connecticut Power Co., extending line from New Haven. Owner builds.

†Kan., Stockdale—BORINGS—U. S. Eng., 232 Mfrs. Exch. Bldg., Kansas City, Mo., making test borings in Republican River Valley, near Milford and Stockdale to Pennsylvania Drilling Co., 1205 Chartiers Ave., Pittsburgh, Pa., $4,274. Est. $5,000. Bids June 13, awarded June 18. Noted June 6, C. D.

Louisiana — OIL PROPERTY DEVELOPMENT, etc.—American Liberty Oil Co., Shreveport, developing oil properties, incl. drilling storage, etc., Jackson and Ouachita Parishes, near Monroe, day labor and separate contracts. To exceed $30,000.

Mass., Plymouth — WHARF — Town, Bd. Selectmen, Town Hall, reconstructing town wharf, to A. A. Hersey & Son Co., 197 Marginal St., East Boston, $23,795. Report bids rejected, incorrect. Noted June 12, C. D. — June 20, E. N.-R.

†Minn., St. Paul — LIGHTING SYSTEM — U. S. Eng., 615 Commerce Bldg., power control and lighting system at Lock and Dam 5a, to A. S. Schulman Electric Co., 537 South Dearborn St., Chicago, Ill., $81,449. Bids June 14, C. D.—June 6, E. N.-R.

Mo., St. Louis — STEPS and RETAINING WALL—G. Moeller Constr. Co., general contractors, 3520 Itaska St., electrical work for steps and retaining wall, Bd. P. Service, City Hall, adjacent to Government Hill Pavilion, Forest Park, for City, to Kramer-Kaemmerlen Electric Co., 2318 Locust St.; lamp standards, to Algonite Corp., 4606 Chippewa St. **P.W.A.** Noted May 24, C. D.

N. Y., Rochester — GAS MAINS — Rochester Gas & Electric Corp., 89 East Ave., constructing extensions of gas mains into Ridgewood Section on Ridge Rd., day labor, $23,500. A. M. Beebe, supt. Gas Dpt.

†Pa., Phila. — DISTRIBUTION SYSTEM — Yards & Docks, Navy Dpt., Wash., D. C., improving gas distribution system, to Drake Avery Co., 147 Westwood Bridge St., Detroit, Mich., $23,363.

Texas — PIPE LINE — Cortez Oil Co., c/o B. F. Weekley, Trinity Life Bldg., Fort Worth, and 1113 Dunlap St., Mission, also Edgar H. Stapper & Co., 21 West St., New York, 85 mi. 10 in. c.i. welded pipe line between Samfordyce oil fields and ports of Port Isabel and Brownsville, to Hope Eng. Co., Mt. Vernon, O., $400,000. Awarded June 11. Noted June 4, C. D.

Wyo., Medicine Bow — OIL DEVELOPMENT —Ohio Oil Co., Casper and Medicine Bow, developing oil properties, drilling, service buildings, etc., in Carbon Co., near here, day labor and separate contracts. To exceed $40,000.

Ont., North Bay — RAILWAY — Nipissing Central Ry., S. B. Clement, ch. engr., North Bay, clearing and grading right-of-way for railway diversion from south of Galt Lake into Lebel Twp., to Richard Walsh, Temagami.

MATERIALS AND EQUIPMENT

PROPOSED WORK

FIRE EQUIPMENT, etc.—**Hot Springs, Ark.** —City, c/o Mayor, voted $85,000, for Fire, Police and Street Department Equipment.

FIRE FIGHTING APPARATUS—**Bloomfield, Conn.** — Town, Blue Hills Fire Dist. plans purchasing fire fighting apparatus, incl. pumper. R. C. Lihou, clk.

WIRE — **Chicago, Ill.** — Dpt. P. Wks., City Hall, rejected bids May 21, furnishing, delivering 50,000 ft. No. 8 A.W.G. stranded, tinned, rubber insulated single braid wire. Noted May 17, C. D.

WASHED GRAVEL—**Gretna, La.**—Jefferson Parish, c/o Parish Police Jury, rejected bids June 12, 100 more or less loads of washed gravel. Noted May 24, C. D.

TANKS—**St. Louis, Mo.**—Central States Oil Co., 9250 Olive Rd., St. Louis Co. applied for permit to install two 12,000 gal. underground steel tanks for gasoline for automobile filling station, 1320 Bway.

TANKS—**St. Louis, Mo.**—Chapman Ice Cream Co., 3912 Easton Ave. granted permit to install one 1,000 gal. underground steel tank for gasoline for private use at 3910 Eastern Ave.

TANKS — **St. Louis, Mo.** — L. Glazer, 5137 Lotus Ave., applied for permit to install three 1,000 gal. underground steel tanks for gasoline for automobile service station, 1540 North 14th St.

TANKS—**St. Louis, Mo.**—Tankar Gas, Inc., 6659 Easton Ave., applied for permit to install three 1,000 gal. and one 500 gal. underground steel tanks for gasoline for automobile service station, 4655 Natural Bridge Ave.

FIRE APPARATUS — **Albany, N. Y.** — Bd. Contr. & Supply soon takes bids fire apparatus, incl. pumps, truck, etc. $20,000.

STEEL TANKS—**Dunkirk, N. Y.**—Atlantic Refining Co., 260 South Broad St., Phila., Pa., plans installing 500 gal. steel tanks and electric pumps in gasoline station, West 5th St. and Central Ave. To exceed $1,000.

FIRE HOSE—**Newark, N. Y.**—Bd. Village Trustees plans purchasing fire hose and other fire department equipment, $1,189. **Maturity at once.**

PIPE—**Westfield, N. Y.**—S. R. Ross, 254-16 Northern Blvd., Little Neck, N. Y., plans purchasing 2,500-3,000 ft. various sized pipe for delivery here or at Mayville.

LUMBER——**Cleveland, O.**—City soon takes bids oak and pine lumber for repair of various bridges, $4,000.

BIDS ASKED

†DESILTING BASIN APPARATUS — **Yuma, Ariz.**—July 12, by U. S. Bureau Reclamation, Denver, Colo., furnishing mechanical apparatus for desilting basins at Imperial Dam and desilting works, on All American Canal. R. F. Walter, Denver, Colo., ch. engr.

†ROLLER GATES—**Yuma, Ariz.**—July 8, by Bureau Reclamation, Denver, Colo., four 75x23 ft. roller gates with operating mechanisms for All American Canal at Canal headworks, Imperial Dam and Desilting works. R. F. Walter, Denver, Colo., ch. engr.

TRUCK BODIES — **Hartford, Conn.** — July 2, by City, Bd. Contr. & Supply, 5 bodies and hoists for truck chassis.

CORPORATION COCKS—**Chicago, Ill.**—July 2, by Dpt. P. Wks., City Hall, furnishing, delivering two thousand 1 in. corporation cocks and five thousand ¾ in and five thousand 1 in. shut-off cocks for Pipe Yard "B." O. E. Hewitt, city engr.

GRAVEL, etc. — **Indiana** — July 2, by Bd. Comrs. Hamilton Co., W. L. Sturtevant, aud., 4,000 cu.yd. screened, graded gravel; 5,000 cu.yd. bank run gravel 125,000 gal. bituminous material; 500 lin.ft. 12 in. galv. corrugated pipe.

DUMP TRUCK—**Vevay, Ind.**—July 1, by Bd. Comrs. Switzerland Co., L. S. Courtney, aud., 1½ ton hydraulic pressure dump truck, 1½ cu.yd. capacity, single wheels, 10 ply tires.

ROAD MAINTAINER—**Williamsport, Ind.**—July 1, by Bd. Comrs. Warren Co., R. Fleming, aud., 1 wheel tractor for pulling road maintainer.

†CARBON PACKING RINGS, etc.—**Boston, Mass.**—July 2, by Bureau Supplies & Accounts, Navy Dpt., Wash., D. C., furnishing carbon packing rings and electric light cable; July 5, for corrosion resisting steel and asbestos felt insulation to Boston Navy Yard. To exceed $1,000.

TRUCK, etc. — **Austin, Minn.** — July 1, by C. M. Hubbard, aud. Mower Co., one truck 2-2½ ton capacity, of chassis and cab only, also 110,000 gal. bituminous materials. A. C. White, co. by. engr.

†TRUCKS—**Vicksburg, Miss.**—July 3, by U. S. Eng., P. O. Box 667, new light delivery pick-up type trucks.

†OIL STORAGE TANKS—**Boulder City, Nev.**—July 11, by Bureau Reclamation, Dpt. Interior, Denver, Colo., 4 switchyard oil storage tanks, and 2 oil sump tanks and appurtenances, f.o.b. cars shipping point or at Boulder City, for Boulder Power Plant, Boulder Canyon Project, Arizona-California-Nevada, Spec. 695-D. R. F. Walter, ch. engr.

†CRANES—**Charleston, S. C.**—July 10, by Yards & Docks, Navy Dpt., Wash., D. C., 20 ton locomotive crane with clam shell bucket at Navy Yard; also 15 ton revolving gantry type crane.

†MACHINE SHOP EQUIPMENT—**Knoxville, Tenn.**—July 9, by Tennessee Valley Authority, Knoxville, machine shop equipment for Wheeler Power Plant. C. H. Garity, dir. Purchases.

PUMP — **St. Mary's Ont.** — Municipality in market for supply of centrifugal pump. W. McKee, St. Mary's, engr.

CONTRACTS AWARDED

IRON and STEEL CASTINGS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., iron and steel castings, 100 c.i. manhole frames, 100 cast steel outer covers for manhole frames, 50 c.i. inner covers for manhole frames, Spec. 1695, to Kay-Brunner Steel Products Co., 999 Meridian St., Alhambra, $3,657. Bids June 14. Noted June 18, C. D.

WELDED STEEL DRIVE PIPE—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., 10,000 ft. 14 in. welded steel drive pipe, delivered as follows: 4,000 ft. 5 days after award, f.o.b. bidders plant, 6,000 ft., 1,000 ft. per month beginning 30 days after award, f.o.b. trucks East Portal Camp, Mono Basin, Spec. 1710, to Southern Pipe & Casing Co., Azusa, $5,090. Bids June 18, awarded June 18.

SWITCHBOARD — **Oakland, Calif.** — J. S. Kimball, secy., East Bay Municipal Utility Dist., 512 16th St., electric switchboard for general office building, to Safety Switchboard Mfg. Co., 960 Howard St., San Francisco, $1,197. Bids June 4, awarded June 13. Noted June 14, C. D.

†STEAM TURBINE—**San Francisco, Calif.**—Con. Q. M., Fort Mason, furnishing, installing 1 steam turbine for present 200 kw. d.c. generator in power plant at Letterman General Hospital, to Murray Iron Wks., 417 Market St., $8,270. Bids May 22, awarded June 12.

EMULSIFIED ASPHALT—**Hartford, Conn.**—City, Bd. Contr. & Supply, C. M. Yale, secy., 100,000 gal. emulsified asphalt, to Texas Co., Riverside Dr., East Hartford, $5,610. Bids June 11, awarded June 13. Noted June 6, C. D.

FUEL OIL TANK—**New Haven, Conn.**—T. A. D. Jones & Co., Inc., 205 Church St., 80,000 bbl. steel fuel oil tank, to Graver Tank & Mfg. Co., Catasauqua, Pa.***foundations, to C. W. Blakeslee & Sons, Inc., 58 Waverly St.*** piping, to Foskett & Bishop, Blatchley Ave. Noted June 7, C. D.—June 13, E. N.-R.

PUMP—**Chicago, Ill.**—Dpt. P. Wks., City Hall, furnishing, delivering one 850 g.p.m. electrically operated vertical shaft pump, for Cermak Pumping Station, to Johnson Pump Co., 37 West Van Buren St., $1,324. Bids May 6, awarded June 12. Noted May 10, C. D.—May 16, E. N.-R.

STEEL RAILS—**Chicago, Ill.**—Grand Trunk & Western R.R., 105 West Adams St., 2,250 tons steel rails, to Inland Steel Corp., 38 South Dearborn St., 6200 tons steel rails, to Illinois Steel Co., 208 South LaSalle St.

†MECHANICAL BRAKES—**Rock Island, Ill.**—U. S. Eng., Clock Tower Bldg., furnishing, delivering 8 auxiliary mechanical brakes for lock operating machinery for Lock and Dam 15, on Mississippi River, to R. W. Kaltenbach Corp., Bedford, O., $856. Bids May 27. Noted June 10, C. D.—May 9, E. N.-R.

BITUMINOUS MATERIAL—**Ames, Ia.**—State Hy. Comn., Ames, 135,000 gal. bituminous material, to C. M. Straight, Ames, $7,470***154,000 gal., to Socony-Vacuum Oil Co., 2 West 40th St., Kansas City, Mo., $7,700***59,000 gal., to Des Moines Steel Co., 421 Southwest 4th St., Des Moines, $3,950***80,000 gal., to Standard Oil Co., Equitable Bldg., Des Moines, $3,200. Grand total $22,320. Bids June 17, awarded June 19. Noted June 11, C. D.—June 13, E. N.-R.

†PIPE CULVERTS — **New Orleans, La.** — U. S. Eng., Prytania St. and River Front, constructing two 72 in. galvanized iron pipe culverts in Melville Ring Levee, to Rouse Constr. Co., Cape Girardeau, Mo., and to E. O. Korsmo Constr. Co., Porter Bldg., Memphis, Tenn., $28,905. Bids Apr. 16.

GRANITE EDGESTONE — **Boston, Mass.** — City, Supply Dpt., W. W. Loomis, supt., City Hall Annex, 30,000 lin.ft. granite edgestone, to T. H. McVey, 53 Market St., Brighton, $27,250. Bids June 10, awarded June 14. Noted June 14, C. D.

PIPE — **Medford, Mass.** — Municipality, 300 tons 16 in. and less c.i. pipe, to Donaldson Iron Works, Emaus, Pa., about $10,000.

†FIRE CLAY BRICK, etc. — **Gasconade, Mo.**—U. S. Eng., 232 Mfrs. Exch. Bldg., Kansas City, 20,000 fire clay brick, 500 soaps, 200 splits, and 10,000 lb. fire clay in 100 lb. bags f.o.b. shipping point, for Missouri River improvement, to Sawyer Material & Coal Co., 503 Westport Rd., Kansas City, $982. Est. $1,500. Bids June 12, awarded June 13.

†STRANDED STEEL WIRE — **Kansas City, Mo.**—U. S. Eng., 232 Mfrs. Exch. Bldg., 210,000 stranded ⅛ in. steel wire for use in Missouri River improvement, to Williamsport Wire Rope Co., Williamsport, Pa., $2,919. Est. $3,000. Bids June 3. Noted June 11, C. D.

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†Federal Government.

Materials, etc. (Continued)

†STEEL VALVES—**Fort Peck, Mont.**—U. S. Eng., Postal Telegraph Bldg., Kansas City, steel valves, elbows, wyes, land pipe, etc., for Fort Peck Dam, to McClintic Marshall Corp., Bethlehem, Pa., $13,853. Est. $12,000. Bids June 12, awarded June 17. Noted June 18, C. D.

†STONE—**Fort Peck, Mont.**—U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, Mo., 500,000 cu.yd. stone for crushing and for toes of Fort Peck Dam, to Tomlinson-Arkwright Co., 312 1st Natl. Bank Bldg., Great Falls, $120,000. Est. $25,000. Bids June 13, awarded June 18. Noted June 18, C. D.

†WATER PUMPS—**Fort Peck, Mont.**—U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, 4 centrifugal electric driven water pumps, direct connected horizontal shaft, to Dayton-Dowd Co., Quincy, Ill., $8,172. Bids May 31, awarded June 17. Noted June 7, C. D.—May 23, E. N.-R.

†GENERATORS — **Brooklyn, N. Y.** — Signal Supply Officer, Army Base, 58th St. and 1st Ave., 350 generators, to Burke Electric Co., Erie, Pa., $49.45 each. Rejected bids May 13, 44 ammeters. Noted Apr. 11, C. D.—Apr. 18, E. N.-R.

STEEL PLATES—**Hudson, N. Y.**—New York Power & Light Co., 126 State St., Albany, 125 tons steel plates for gas holder tank, to Chicago Bridge & Iron Co., 37 West Van Buren St., Chicago, Ill. Est. exceeds $1,000.

GRAVEL, etc.—**Niagara Falls, N. Y.**—Emergency Relief Bureau, Niagara Falls, 338 tons gravel, to Fiona Bros., Niagara Falls, $402••• 18,000 brick and 217 bbl. cement, to Thomas Cox Co., Niagara Falls, $265 and $505 respectively•••220 tons bituminous macadam, to Empire Builders Supply, Inc., Niagara Falls, $1,100•••30,000 gal. road oil, to Socony Vacuum Oil Co., Niagara Falls, $2,036. Grand total $4,308. Awarded June 5.

STEEL PLATES—**South Glens Falls, N. Y.**—New York Power & Light Co., 126 State St., Albany, 125 tons steel plates for gas tank holder, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill. Est. exceeds $1,000.

CEMENT, etc.—**Syracuse, N. Y.**—Bd. Contr. & Supply, City Hall, 1,200 bbl. portland cement, to Wilson & Greene Lumber Co., 516 Burt St. •••500 cu.yd. sand, to Lowery Bros., 528 West Colvin St.•••11,000 brick, to G. W. Pack & Son, 1101 North State St.•••22,500 sq.ft. wire mesh reinforced concrete, to H. Osborne, 115 Valley Dr. •••and manhole steps and basin grates, to Thelen Iron Wks., 920 Canal St. Noted June 4, C. D.—June 6, E. N.-R., under "Contracts Awarded."

GRADER ROLLER POWER SHOVEL, etc.—**Syracuse, N. Y.**—City, Bd. Contr. & Supply, 10 ton grade roller, power shovel and dipper stick, to Street Bros. Constr. Co., 921 East Hiawatha Blvd., to exceed $1,000. Awarded June 15.

STEEL BARS—**Wende, N. Y.**—Erie County Emergency Relief Bureau, Buffalo, 109 tons reinforcing steel bars for rein.-con. tunnel, to Beals, McCarthy & Rogers, 50 Terrace St., Buffalo, $5,352.

†RADIAL GATES, etc. — **Oregon** — Bureau Reclamation, Denver, Colo., three 18x17 ft. radial gates, 3 motor driven double drum radial gate hoists, two 3 ft. 3 in.x3 ft. 3 in. gates and two 42 in. diam. welded plate steel outlet pipes, Items 1 and 2, to Commercial Iron Works, 380 East Stephens St., Portland, $5,900 •••Item 3, to International Eng., Inc., Dayton, O., $6,450•••Item 4 to Consolidated Steel Corp., Ltd., 6500 East Slauson St., Los Angeles, Calif., $3,845. Grand total $16,285. Bids Mar. 20. Noted Apr. 1, C. D.—Feb. 20, E. N.-R.

★ †GENERATORS—**Portland, Ore.**—U. S. Eng., 2 alternating current generators for Bonneville Dam, to General Electric Co., River Rd., Schenectady, N. Y., $1,188,367. Bids May 24. Noted June 4, C. D.—May 16, E. N.-R.

†WATER HEATERS — **Almira, Wash.** — Bureau Reclamation, Denver, Colo., thirty-five 30 gal. and one 120 gal. electric storage water heaters, and thirty 3,000 watt sidearm circulation type electric water heaters for residences at Government Camp at Grand Coulee Dam, Columbia Basin Project, Schedule 1, to Cleveland Heater Co., 1900 West 112th St., Cleveland, O., $1,338; Schedule 2, to Wesix Inc., 390 1st St., San Francisco, Calif., $434. Bids Mar. 21. Noted Mar. 11, C. D.—Mar. 14, E. N.-R.

†SLIDE GATES — **Grafton, W. Va.** — U. S. Eng., Federal Bldg., Pittsburgh, Pa., slide gates for Tygart River Dam, to Michigan Valve & Fdry. Co., 3631 Parkinson St., Detroit, Mich., $159,867. Noted May 21, C. D.

STREET LIGHTING — **Arcadia, Wis.** — City, to Northland Electric Co., Minneapolis, Minn., 2 carloads western red cedar poles, $1,060••• to Graybar Electric Co., Inc., 778 North Milwaukee St., Milwaukee, 12 transformers, $1,835 •••to Westinghouse Electric Supply Co., Inc., 546 North Broadway, Milwaukee, 42 concrete posts, $2,060; 5,300 ft. cable, $822; 26,871 lb. insulated electric wire, $4,638. Grand total $10,415.

†REINFORCING STEEL, etc. — **Milwaukee, Wis.**—National Park Service, 5,000 lb. reinforcing steel, to Inland Steel Co., 208 East Wisconsin Ave., $2.33 per cwt.•••22,000 bd. ft. No. 1 yellow pine lumber, to North Side Lumber & Fuel Co., 1014 East Chamber St., $53 per 1,000•••1,000 bbl. portland cement, to Cities Fuel & Supply Co., 6639 West National Ave., $2.4196 and $2.5196 per bbl.

†WIRE ROPE—**Milwaukee, Wis.**—U. S. Eng., 37,089 ft. wire rope, to Hazard Wire Rope Co., 400 West Madison St., Chicago, Ill., $11,043. Bids June 11.

FOREIGN

Australia, Brisbane — Municipality awarded contract constructing bridge at Kangaroo Point, to Evans, Deakin & Hornibrook Constructions Ltd., Brisbane, $5,770,000. Noted Mar. 7, E. N.-R.

Australia, Canberra—Government voted $48,800,000 to Public Works Department, for construction work during 1935-36 for commonwealth and state buildings.

Australia, Sydney—Aug. 12, by City Engineer, supplying 30 metal clad oil immersed isolating and earthening switches for 11,000 volt circuit.

Brazil, Rio de Janeiro — Owner, c/o Wolf Klavin, Rio de Janeiro, is at head of project to construct and operate viscose rayon mill near here. Site has been acquired and work on initial buildings will begin at early date. Negotiations have been completed with Tubize Chatillon Corp., 2 Park Ave., New York, for purchasing equipment from viscose rayon mill at Hopewell, Va., at a price reported in excess of $2,000,000. Plant will consist of several large operating units with power house, machine shop and other mechanical structures, est. $3,000,000 incl. additional equipment to be installed. Noted Apr. 4, E. N.-R., under "Sao Paulo."

Chile — Caja de Credito Minero, Santiago, constructing sulphur refinery, separate contracts, $500,000.

Egypt, Cairo—Aug. 3, by Ministry of Public Wks., supplying and erecting 3 cold starting diesel engines, 3 pumps, station service auxiliaries, filtration plant, etc. at Sabel. Details and tender blanks can be obtained at Egyptian Consulates.

England — Birmingham City Council, improving River Lea, to Bolton & Lakin, Ltd., 8 Waterloo St.•••**Chesterfield** City Council, town hall, to R. Carlyle & Co., Ltd., Elsimore Rd., Old Trafford, Manchester, $515,000. Bradshaw, Gass & Hope, 19 Silverwell St., Bolton, archts. •••Pollard, Wain & Co., Rosebery Rd., **Anstey,** plans manufacturing plant•••Hadfield (Merton) Co. Ltd., **Mitcham,** plans paint and varnish plant on Western Rd., $600,000•••Lowestoft Water & Gas Co. Ltd., **Lowestoft,** plans extensions, $175,000•••Advance Laundries Ltd., **Minster,** plans reconstructing plant, $380,000 •••J. Jarvis & Partners, **Jarrow,** plans aeroplane parts factory, $500,000•••Davis Estates Ltd., High Rd., **Kinburn,** preparing plans 472 houses, $754,000.00•••S. R. Hobday, secy. Lee Conservancy Bd., Surry House, Victoria Embankment, **London,** soon takes bids constructing and delivery of dredging plant, incl. 50x13 ft. center cutting ladder dredger; crab excavator on caterpillar tracks and on floating pontoon, motive power of both machines to be of diesel engine type, outline plan, specifications, and forms of tenders from Engineer B. Howorth, Enfield Lock, Middlesex•••Airports Ltd., 15 Elizabeth St., **London,** G. A. Gordon, secy., London, plans airport on 99 acre estate at Gaturek•••Sims & Co. Ltd., Roseberry Rd., **London,** preparing plans slipper and shoe manufacturing plant•••Raynor & Co. Ltd., Commercial Rd., **London,** preparing plans essence distillery•••O. Faher Romney House, Marsham St., **London,** preparing plans warehouse, for Pinchin, Johnson & Co., Ltd., 4 Carleton Terrace, London, $400,000•••Henry Tanner, 5 Hanover Sq., **London,** office building for Boots Pure Drug Co. Ltd., to Hollaway Bros. London, Ltd., Bridge Wharf, Millbank, $500,000•••**Walsall** Education Committee voted $530,000 for technical college and high school•••**Leeds** City Council plans by own architect 1,600 houses at Holton $2,400,000•••**Huddlesfield** Town Council plans by own architect 176 houses on Alder St., $288,500••• **Lewisham** Town Council plans by own engineer, library and swimming baths, $600,000••• **Southampton** Town Council voted $500,000 for reconstructing public baths, tenders in July••• Press Caps Ltd., 21 Gorst Rd., **Willesden,** preparing plans factory for manufacturing washing machines•••R. Thomas & Co. Ltd., **Scunthorpe,** preparing plans erecting brick and tile works at Doncaster•••Alflect & Courtney, Hill House, Market Pl., **King's Lynn,** plans factory building for Bradfield, Ibbotrow & Co., Ltd., Norfolk St., $410,000•••Kert Plating & Enamelling Co. Ltd., Victoria Rd., **Ashford,** preparing plans new plant on Beachfield St.•••**Leeds** City Council bids in July bridges, $2,000,000••• **Driffield** Rural Council voted $431,615 for waterworks extension•••Leicester Ltd., Market Pl., **Bursiem,** preparing plans factory, on Marshall St., $300,000•••Johnson Bros. Ltd., **Hanley,** preparing plans office block and packing department, $500,000•••**Hornchurch** County Council of Essex, for Sutton Hospital extension, to Harnold & Son, Ltd., Printing Office St., Doncaster, $1,058,080•••British Cellophane Co. Ltd., **Bridgewater,** constructing plant, to Melvelle, Dundas & Whitsome Ltd., 224 St. Vincent St., Glasgow, $2,500,000•••Bata Shoe Co. Ltd., East Tilbury, preparing plans for $1,000,000 industrial and residential development, **Orsett**•••Pick, Everard, Keay & Grimmon, 6 Milestone, London, plans office building, **Leicester,** for Imperial Typewriter Co. Ltd., London Rd., Leicester, $500,000.

England—E. Hart, clk. of Middlesex County Council of Guildhall, Westminster, listing names of intending bidders for engineering works to be carried out at county sanitarium, incl. rebuilding boilers, clarifiers and auxiliaries, electric generator sets, and water softening plant. **London•••Dagenham** Urban Council plans by E. B. Webber, 2 New Square, London, municipal building, $554,725 voted•••F. Craven, **Leicester,** preparing plans constructing 500 houses, $760,000•••I. Lane & Son, Swinton, preparing plans 360 houses, **Woolston,** $500,000••• E. Printice, Mawson, archt. preparing plans winter garden building for Portsmouth Town Council, **Swansea,** voted $750,000•••**Eton** Rural Council, plans by H. Boot & Son Ltd., London, constructing 424 houses, $620,000.

England—July 11, by Secretary Metropolitan Water Bd., **London,** supplying and erecting 2 vertical high compression heavy fuel oil engines with centrifugal pumps for Hornsey Pumping Station•••July 12, by H. Harmer, city engr., **Kingston-upon-Hull,** supplying and constructing pontoon landing stage and approach bridge at Victoria Pier, mild steel pontoon, 150x50x9 ft. with timber decking, accessories and equipment, roofing with steel trusses covering part of pontoon, steel lattice girder approach bridge, 180 ft. span, mass concrete abutment, piling, sheet steel piling, timber and rein.-con. mooring dolphins and protected works.

France, Cannes — Municipality installing machinery and equipment and constructing water system, to Vickers Metropolitan Ltd., Trafford Park, Manchester, England, $4,000,000.

Hungary—Gschwindt Alcohol Co. Ltd. and Salgo-Tarjaner Coal Mining Co., Budapest, plans soda chemical plant. To exceed $500,000.

India—G. G. S. Young, secy. Bombay, Baroda and Central India Ry., 91 Petty France, Westminister, London, England, in market for supply 28 mi. 0.3 sq.in. copper contact wire and for 38 mi. 0.375 copper catenary wire.

Latvia — Government, awarded contract for bridge over Dwink at Hrustpils, to Braithwaite & Co. Ltd., Westminster, London, England. Will require over 1,000 tons steel.

New Zealand—July 30, by Deputy Minister Ports & Telegraph Dpt., **Wellington,** for supply 500 receivers, 4,000 carpieces and nuts; Aug. 1, for 50 mi. insulated bronze wire to B.P.O. Spec.; Aug. 2, 150 mi. cable; Aug. 5, for 10 mi. telephone cable; Aug. 6, 400 junction blocks; Aug. 7, 200 cradles for microtelephone sets to B.P.O. Spec.; Aug. 9, 2,000 guy clamps to B.P.O. Spec.; Aug. 12, for 150 mi. tinned annealed copper wire and 2,000 switchboard lamps to B.P.O. Spec.; Aug. 15, 1 mi. V.I.R. cable to B.P.O. Spec.; Aug. 16, 500 resistance spools to B.P.O. Spec.; Aug. 19, mouthpiece connections to B.P.O. Spec. and 2½ tons jointers metal; Aug. 20, 12,500 instruments and switchboard cords and 3,000 automatic dials to B.P.O. Spec.; Aug. 21, 2 motor generator sets; Aug. 22, 1,100 lamp caps to B.P.O. Spec.; Aug. 26, 200 lb. bituminous tape; Aug. 28, 30 tons cadmium copper wire and 480 bundles cadmium copper tapes•••Aug. 13, by Secretary Public Works, Supplies & Tenders Committee, **Wellington,** indoor switchgear and control equipment for Arapuni System•••July 16, electrical laundry ironing machine•••Sept. 17, equipment for electric lift for Arapuni Power Scheme•••Ministry of Pub. Wks., **Wellington,** plans erecting line to supply Southland with power from Waitaki at $500,000 and extension at Monowai, $500,000•••Central Waikato Electric Power Bd., **Waitaki,** plans veticulation schemes, incl. 11,000 volt extension, consumers installations livened up at Matahura and at Raglan and Ruawara••• South Canterbury Electric Power Bd., **Canterbury,** plans erecting lines during year to cost $600,000•••**Wellington** City Engineer, bids in July for supplying, installing additional modern generator plant at Evan Bay Power Station, incl. 15,000 steam generator plant•••**Dunedin** City Tramway Manager, bids Sept. 25, supplying 275 B.H.P. auto-synchronous motor and reduction gear for cable tramways•••Sept. 2, by General Manager New Zealand Railways, **Wellington,** 90,000 gal. locomotive bearing oil •••Dept. Wks., **Wellington,** 100 mi. V.I.R. wire, to W. T. Henley's Telegraph Wks. Co., Wellington, $5,000 and for 21 drums D.C.L.C. cable, to W. T. Glover Co. Ltd., Auckland, $6,650.

New Zealand, Wellington — Deputy Minister Posts & Telegraph Dpt. in market 5,000 metal cased condensors.

Northern Ireland, Belfast—W. I. Quinn, secy. Belfast Water Works, in market for supply 7.5 mi. cast iron pipes, 36 in. internal diam. and 7.5 mi. steel pipes 36 in. internal diam.

Northern Ireland, Belfast — Kemp & Tasker, archts., Westminster, London, England, preparing plans theatre, College St., $510,000 available.

Palestine, Jerusalem — Municipality plans parkway system, sports, playgrounds, facilities, water system, and sewerage system, $500,000. To be financed by loan and bond issue.

Scotland — Greenock Harbour Trust Comrs. making plans dock extension, $1,250,000••• **Aberdeen** Town Council plans housing school for 5,000 houses, $6,000,000; Farquarson Bros., Ltd., Holland St., Glasgow, preparing plans carton paper manufacturing at Anniesland••• Whyte & Gallaway, 1221 Bath St., **Glasgow,** preparing plans factory for Claude Alexander Ltd. of Bridgton•••J. M. Connell, **Coatbridge,** plans constructing steel and iron works.

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†*Federal Government.*

Foreign (Continued)

Scotland, Methie—Town Council plans 320 houses, $500,000; Public Health Committee, **Edinburgh**, plans by E. J. MacRae, 7 story addition to Wester General Hospital at Graigleith, $600,000 available.

South Africa—Griquatown City Engineer interested in prices for supplying and erecting of electrical plant, oil engine, generators, motors, cutouts*****Port Elizabeth** City Engineer bids Aug. 22, supplying and erecting complete purification plant of 5 m.g.p.d. capacity.

South Africa, Salisbury — National Maise Products Ltd., plans by G. D. Irvin, plant for manufacture of power alcohol and other products from maise.

Wales—A. E. Farr, civil engr. and contractor, London, England, preparing plans 6,280 ft., steel, concrete bridge between Blackley and Aust, providing for 2 lanes of traffic.

Wales, Swansea — H. L. Lang Coath soon takes bids from manufacturers for supply at power sttaion TirJohn, of 1,750 kw. diesel engine and alternator, with exciter, oil cooler and auxiliary plant.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Bakersfield—Supervs. Kern Co., election July 30, $450,000 bonds, proceeds to be used with expected Federal grants to finance construction Central library building, $250,000; hospital addition, $250,000 and detention home, $30,000, foregoing at Bakersfield; natatorium, $35,000; library, $20,000; hospital, $40,000, foregoing at Taft; hospital in Delano, $40,000.

Calif., El Centro—El Centro City Council, El Centro, plans by C. Beelman, 1019 Union Bank Bldg., combination city hall and library, $150,000. Application to be made to P.W.A. for funds.

Calif., Salinas — Monterey Co. plans by C. Butner, 51 Maple St., Salinas, and R. Stanton, Carmel, courthouse. $250,000 or more. Supervs. Monterey Co. will seek P.W.A. grant and loan. If approved, bond election will be called.

†Conn., New London — Commander Coast Guard Training Station, plans constructing station $65,000, repairing buildings $15,500, and chapel $160,000, at Coast Guard Academy.

★ **Conn., Norwalk**—City, Bd. Educ. plans by Visscher & Burley, 51 East 42nd St., New York, brick, steel high school, $1,000,000. $400,000 grant approved. J. L. Burley, Pine Hill Rd., Norwalk, and Tooker & Marsh, 101 Park Ave., New York, assoc. archts. Noted June 12, C. D.—June 20, E. N.-R.

Conn., Old Saybrook — Town, G. B. Smith, chn. Building Comn., plans new high school, with federal aid, $105,000. Architect not appointed.

★ **†Fla., Jacksonville**—Public Wks. Administration, Wash., D. C., plans constructing 1 and 2 story stucco row houses, on 40 acre site, $1,000,000 allotted.

Ga., Augusta—City, c/o Mayor, City Council, City Hall, plans by Scroggs & Ewing, and C. B. Thompson, S.F.C. Bldg., assoc. archts., 1 story, basement, balcony, 120x170 ft., brick, rein.-con., steel beam auditorium, $200,000.

Ill., Wood River—City making plans power plant. Burnes & McDonnell Eng. Co., 107 Linwood Blvd., Kansas City, Mo., engrs.

Ia., Denison—Independent School Dist. election in July to vote $90,000 to $120,000 bonds for constructing high school.

Ia., Fairfield—City Council preliminary studies constructing dam and municipal light and power plant operated by steam, distribution system submitted. $450,000-$1,000,000. Marsh Eng. Co., 206 Masonic Temple, Des Moines, engrs.

†Ky., Louisville—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office addition. $145,000.

Ky., Madisonville—Bd. Educ. plans by Harry E. Boyle & Co., 405 Furniture Bldg., Evansville, Ind., 2 story, basement, 140x192 ft., brick, rein.-con., structural steel school, containing 13 classrooms, combination auditorium and gymnasium, domestic science and manual training departments, library, cafeteria, science department, study hall, laboratory, $125,000.

Ky., Marion—Bd. Educ. plans by Harry E. Boyle & Co., 405 Furniture Bldg., Evansville, Ind., 3 story, 149x267 ft., brick, stone, structural steel, rein.-con. school, incl. 10 classrooms, combination auditorium and gymnasium, library, domestic science and manual training departments, science department and large study hall, $125,000.

†Ky., Newport—Federal Housing Authority, E. Rentz, in charge, Newport, soon takes bids housing development. $400,000. **Maturity soon.** C. C. and S. K. Weber, 111 East 4th St., Cincinnati, O., archts.

Me., Portland—City, J. E. Barlow, mgr., City Hall, sketches by E. L. Higgins, 514 Congress St., 1 story, brick, steel boiler house, concrete found. at Farrington Hospital, Brighton Ave. $40,000. Noted Feb. 6, C. D.—Feb. 14, E. N.-R.

†Mass., Boston—Yards & Docks, Navy Dpt., Wash., D. C., plans brick marine guard building, concrete found., South Boston Dry Dock. $22,000.

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Mass., Spencer — Town, Superintendent of Schools, Town Hall, sketches by Frost, Chamberlain & Edwards, 390 Main St., Worcester, 2 story, basement, 90x140 ft., brick high school addition, concrete found., Main St. To exceed $150,000. Drawings submitted to State PWA officials.

Mass., Ware—Town, W. R. Barry, supt. Schools, plans brick elementary school, concrete found. To exceed $150,000. Architect not appointed.

†Mass., Watertown—Con. Q. M., plans new quarters at Watertown Arsenal. $124,800.

†Mass., Winthrop—Con. Q.M. plans warehouse, $35,000; garage $20,000; telephone lines $2,500; new quarters $137,600; repairing buildings $15,000, at Fort Banks. Total $210,100.

Mich., Saline—Village retained Francis Eng. Co., engrs., Eddy Bldg., Saginaw, to prepare plans and estimates for complete brick, steel, concrete municipal light and power plant. To exceed $105,000.

Miss., Greenwood—City making plans power plant improvements. $200,000. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs.

Mo., St. Louis — City, c/o Bd. P. Service, withdrew bids to have been opened June 28, constructing police station, pending selection of new site. $110,000. A. Osburg, city archt. W. C. E. Becker, city engr.

★ **Neb., Lincoln** — Bd. Educ., J. G. Ludlese, chn., plans school. $1,100,000 P.W.A. grant.

N. J., Highland Park — Bd. Educ. plans constructing Franklin Junior High School addition. $156,000. P.W.A. project. A. Merchant, New Brunswick, engr. Noted Jan. 21, C. D.—Jan. 24, E. N.-R.

★ **N. J., Newark**—Bd. Educ., Green St., plans by C. I. Shirley, Green St., high school, Roseville Section, $1,464,000***altering 3 story, basement school for a high school, Belmont Ave., $164,735***constructing 3 story school addition, Weequahic Ave., $225,000; addition to Newark School of Fine and Industrial Arts, High St., $360,000; altering Market Street School for high school, $21,000; and Cleveland Ave. School for Junior High School, $6,000. Total $2,240,735. Will apply for P.W.A. loan.

N. Y., Bath—Bath Memorial Hospital plans by C. S. Barrows, 56 James St., Rochester, constructing hospital. $150,000. Applied for P.W.A. loan.

N. Y., Bellaire—Bd. Educ., 500 Park Ave., New York, plans by W. C. Martin, Flatbush Ave. extension and Concord St., Brooklyn, for Andrew Jackson High School, and soon takes bids 3 story, 317x402 ft., 116th Ave., Cross Island Blvd. and 208th St. $1,375,000. Site selected. P.W.A. project.

★ **N. Y., Buffalo**—City, T. J. Morrison, comr. P. Wks., H. W. Baker, city mgr., City Hall, plans fire headquarters on North St. and University Ave. $500,000. Applied for P.W.A. loan and grant.

N. Y., Clymer — Bd. Educ., plans by R. A. Freburg, Jamestown, constructing grade and high school. $105,000. Noted Feb. 19, C. D.—Feb. 28, E. N.-R.

N. Y., Corona—Dpt. Health, 139 Centre St., New York, soon takes bids 3 story, 86x108 ft., brick, steel health center, 31st Ave. and 14th St. $180,000. Clay & Corrigill, 101 Park Ave., New York, archts.

N. Y., East Greenbush — Central School Bd. plans Central Grade and High School. To exceed $105,000. Architect not appointed.

N. Y., Long Branch—City made plans municipal power plant and tunnels. L. A. Harding, Prudential Bldg., Buffalo, engr. Noted May 23, C. D.—May 30, E. N.-R.

N. Y., New Berlin—Central School Bd. plans school. To exceed $105,000. Architect not appointed. Village to vote on centralization school districts June 28.

N. Y., Syracuse—City, City Hall, plans remodeling jail and court house addition, Cedar St., $116,000. J. R. Vedder, S. A. and K. Bldg., archt.

N. Y., Yardville—Hamilton Twp. Bd. Educ., 2090 Greenwood Ave., Trenton, plans by H. L. Mack, 2428 Liberty St., Trenton, school. $200,000. Applied for P.W.A. loan.

★ **O., Akron**—Akron University plans by M. E. Harpter, and others, Flatiron Bldg., gymnasium, pool, theatre, auditorium, etc. $1,650,000.

O., Cincinnati—State, c/o Adjutant General, Columbus, authorized by last Legislature to expend $175,000 for new armory to replace Helen St. Armory. Site to be selected later.

★ **†O., Toledo**—Federal Housing Authority, E. F. Weiler, in charge, 17 Proctor Pl., plans by Britisch & Munger, et al., Nicholas Bldg., constructing group of tenements and dwellings, Indiana Ave., Hamilton, South 15th and Division Sts. $4,000,000.

S. C., Sumter—City, F. B. Creech, mayor, plans by E. Stillwell, Hendersonville, and J. Whitney Cunningham, Sumter, associated archts., theatre and city hall. $112,000. Application made for PWA loan.

Tex., Galveston—State Psychopathic Hospital, Galveston, plans hospital building unit and complete equipment for hospital care. $127,500. State Bd. Control approved appropriation of funds, available between Sept. 1935 and Sept. 1936. Architect, c/o Owners, archt.

Tex., Tyler—Bd. Educ., c/o J. Hodges, supt., sketches by S. Simons, Citizens Natl. Bank Bldg., 2 story, semi-fireproof elementary school, $150,000, filing application with P.W.A. [illegible] for loan; also sketches, 3 story, semi-fireproof public school building for colored children, $100,000.

†Utah, Fort Douglas—Con. Q. M. plans officers quarters, chapel, veterinary hospital, garage and shop buildings at Fort Douglas Military Reservation. $201,350 allotted.

†Vt., Fort Ethan Allen — Custodian Fort Ethan Allen, plans non-commissioned officers quarters, chapel, magazine, housing, telephone connections, and motorization. $276,500.

Wash., Vancouver—See "Unclassified."

Wis., Milwaukee—Wisconsin Consistory, 713 East Wells St. soon takes bids 4 story, 88x220 ft., brick, steel consistory building, plain found., East State St. Eschweiler & Eschweiler, and Grassold & Johnson, 759 North Milwaukee St., archts. Noted Mar. 6, C. D.—Mar. 14, E. N.-R.

★ **Alta., Edmonton**—City Council voted $1,064,000 for extension to city power plant, incl. supply and installation of 20,000 KWH generator and 1 boiler building and all necessary equipment. Noted Mar. 5, 1934, C. D.—Mar. 8, 1934, E. N.-R.

Newfoundland, St. Johns—Govt., plans altering and constructing brick addition to General Hospital, plain found. $160,000. Dpt. Pub. Health & Welfare, St. Johns, archt.

Ont., London—Dpt. National Defence, Ottawa, bids end of June, constructing 2 story, 55x110 ft., brick, steel drill hall, plain found., Wolseley St.

P. E. I., Summerside—City Educ. Bd. plans 1935 replacement of high school. $115,000. Architect to be appointed.

BIDS ASKED

†Ala., Huntsville—July 8 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted May 28, C. D.—June 6, E. N.-R.

†Calif., San Pedro—July 5 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted May 14, C. D.—May 16, E. N.-R.

†Calif., San Rafael—July 9 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†Calif., Van Nuys—July 3 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted May 14, C. D.—May 16, E. N.-R.

†Colo., Denver—July 2 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., elevator plant in Custom House.

†Colo., Denver—July 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Mint. Noted Aug. 7, C. D.—Aug. 9, E. N.-R.

★ **†D. C., Wash.**—July 19, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing Department of Interior Building. $11,110,000. Noted June 20, C. D.

†Fla., Bradenton—July 5 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted May 22, C. D.—May 30, E. N.-R.

†Ill., Chicago—July 8 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing Post Office Morgan Park Station. Noted June 3, C. D.—June 6, E. N.-R.

†Ill., Fort Sheridan—July 3, by District Commander, roofing and covering for 21 camps; electrical materials and supplies for 21 camps; lumber for 6 fixed camps; portable building sections for 15 camps; miscellaneous lumber for 15 portable camps; plumbing and sheet metal work for 21 camps, all for Citizens Conservation Camps.

†Ill., Hines—July 16 (extended date), by Vet. Bu., Arlington Bldg., Wash., D. C., constructing linen exchange building.

†Minn., Minneapolis — July 16 (extended date), by Vet. Bu., Arlington Bldg., Wash., D. C., constructing personnel garage.

†Miss., Philadelphia—July 5 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted May 28, C. D.—June 6, E. N.-R.

†Mo., Joplin — July 2 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing extension to U. S. Post Office. Noted May 22, C. D.—May 30, E. N.-R.

Mo., St. Louis — July 3, by St. Louis Bd. Educ., 911 Locust St., roofing, sheet metal work, insulation, retaining walls, and wire fence for school repairs. G. W. Sanger, c/o owner, comr. Buildings.

†Mont., Dillon—July 1 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted May 22, C. D.—May 30, E. N.-R.

N. Y., Albion — July 18, by Commissioner Dpt. Correction, State Office Bldg., Albany, coal handling apparatus, power house, at Albion Training School.

N. Y., Brooklyn—July 10, by Dpt. Hospitals, Municipal Bldg., New York, general building construction, alteration and elevator, plumbing

†Federal Government.

Public Buildings (Continued)

and fixtures, heating, ventilating, electrical work for resident physicians and internes residence, at Kings County Hospital.

N. Y., Brooklyn—July 3 (extended date), by Adjutant General, Div. Military and Naval Affairs, Executive Dpt., Capitol, Albany, heating work at 106th Infantry Armory. Noted May 21, C. D.—May 23, E. N.-R.

N. Y., Comstock—July 11, by Dpt. Correction, State Office Bldg., Albany, heating, miscellaneous additional work at Great Meadows Prison.

N. Y., Dannemora—July 18, by Dpt. Correction, State Office Bldg., Albany, constructing miscellaneous additional metal work at Clinton Prison.

†N. Y., Granville—July 15, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted May 1, C. D.—May 9, E. N.-R.

†N. Y., Ilion — July 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted June 12, C. D.—June 20, E. N.-R.

N. Y., Middletown—July 3 (extended date), by Commissioner Mental Hygiene, State Office Bldg., Albany, construction, heating, sanitary and electrical work for staff accommodations, Middletown Homeopathic Hospital. Noted May 21, C. D.—May 23, E. N.-R.

N. Y., Mount Morris—July 18, by Commissioner Dpt. Health, State Office Bldg., Albany, additional heating work and coal handling equipment for treatment of tuberculosis, Mount Morris.

N. Y., New York—July 10, by S. S. Goldwater, comr. Hospitals, Municipal Bldg., special type lighting fixtures Contr. 1; standard type lighting fixtures, door number plates and hardware, Contr. 2, for Psychopathic Hospital, East 29th St., 1st Ave., East 30th St. and East River, Manhattan Boro.

†N. Y., New York — July 3 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., elevator in Post Office Station O. Noted May 27, C. D.—May 30, E. N.-R.

†N. Y., New York—July 23, by Vet. Bu., Arlington Bldg., Wash., D. C., constructing and finishing boiler house, additional boiler equipment.

N. Y., Orchard Park—July 2, by Bd. Educ., Union Free School Dist. 1, construction, heating, electrical work, sanitary work for 9 room addition and high school, Lincoln Ave, Hudson & Lincoln Ave. Hudson & Hudson, Dunn Bldg., Buffalo, archts.

N. Y., Ossining — July 11, by Commissioner Correction, State Office Bldg., Albany, miscellaneous additional work in power house, Sing Sing.

N. Y., Rome—July 24, by Commissioner Dpt. Mental Hygiene, State Office Bldg., Albany, heating work (new boilers) and coal handling apparatus, power plant equipment for Rome State School.

N. Y., Saratoga Springs—July 18, by P. B. Noyes, chn. Saratoga Springs Comn., 15 Spring St., built-in equipment for administration and laboratory building.

N. Y., Schenectady—July 26, by Dpt. Military & Naval Affairs, Albany, constructing state armory and service connections, $450,000. W. E. Haugaard, State Office Bldg., Albany, archt.

N. Y., Walkill — July 11, by Commissioner Dpt. Correction, State Office Bldg., Albany, refrigeration work, cold storage building, Medium Security Prison.

N. Y., Woodbourne—July 18, by Dpt. Correction, State Office Bldg., Albany, additional heating work and coal handling apparatus, power house, at Woodbourne Institution for Defective Delinquents.

†N. C., Albemarle—July 9 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., supplemental bids constructing U. S. Post Office. Noted June 6, C. D.

O., Cleveland—July 15, by Bd. Educ., c/o J. G. Bender, purch. agt., 1380 East 6th St., boilers and stokers for West High, Mayflower, Standard and Dyke Schools; new roofs and sheet metal work at John Adams High and Halle Schools.

Ore., Sheridan—July 2, by Directors School Dist. 48, for school. G. H. Jones, Woodlark Bldg., Portland, archt.

†Pa., Phila. — July 3, by Yards & Docks, Navy Dpt., Wash., D. C., altering Buildings 59, 77 and 87 at Naval Aircraft Factory, at Navy Yard. $100,000. Noted May 27, C. D.—May 30, E. N.-R.

†Pa., Pittsburgh—July 8 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing South Hills Branch U. S. Post Office. Noted May 28, C. D.—June 6, E. N.-R.

†S. C., Columbia—July 1 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., elevator in Court House. Noted May 22, C. D.—May 30, E. N.-R.

†Tex., Fort Bliss—Con. Q. M., Fort Bliss, taking bids constructing 19 built-in-place Citizens Conservation Camp buildings incl. sewage system, distribution lines, water storage tanks.

Va., Richmond—July 2, by Medical College of Virginia, W. T. Sanger, pres., new central heating plant and underground tunnels for college and buildings associated therewith. $130,000. P.W.A. project. G. A. Peple, 925 American Bank Bldg., consult. engr. Noted Jan. 18, C. D.—Jan. 24, E. N.-R.

†Federal Government.

CONTRACTS AWARDED

Ark., Jonesboro—First District State College, c/o Bd. Trustees, teachers training school building, play court and general purpose room, students commons building, heating plant and laboratory building, field house and stadium, to Gamble Constr. Co., 620 Chestnut St., St. Louis, Mo., $335,000. Bids June 7. **P.W.A.** Noted May 24, C. D.

†Calif., Mare Island—Yards & Docks, Navy Dpt., Wash., D. C., altering boilers for natural gas burning, to F. W. Snook, 59 Clay St., San Francisco, $17,792.

Calif., Sacramento—State Dpt. P. Wks., Div. of Architecture, P. Wks. Bldg., furnishing, installing electrical roll call and page call systems in Assembly Chamber, State Capitol, to American Signal Corp., 210 West Michigan St., Milwaukee, Wis., $19,800. Bids May 28, awarded June 12.

†Conn., Danielson—Tremaglio Bros., general contractors, 1500 Highland Ave., Waterbury, reinforcing steel for post office for Treas. Dpt., Wash., D. C., to Sweet's Steel Co., Williamsport, Pa.***structural steel, to Porcupine Co., Fairfield Ave., Fairfield***cast concrete, to Durastone Co., P. O. Box 61, Saylesville, R. I. Noted Apr. 23, C. D.—Apr. 25, E. N.-R., under "Contracts Awarded."

★**†D. C., Wash.**—Architect of Capitol, Wash., D. C., constructing Congressional Library Annex, to Consolidated Eng. Co., 20 East Franklin St., Baltimore, Md., $6,269,400.

†Fla., August—National Park Service, Dpt. Interior, Wash., D. C., constructing headquarters and utility building, water supply and disposal plant, to O. P. Woodcock, 421 Duval Bldg., Jacksonville, $27,600.

†Fla., Jacksonville—Treas. Dpt. at office Sup. Archt., Wash., D. C., air conditioning, etc. U. S. Court House, to Carrier Eng. Corp., 301 Tower Bldg., Wash., D. C., $37,654. Bids May 3. Noted Apr. 18, C. D.—Apr. 25, E. N.-R.

†Georgia—Con. Q. M., Atlanta, constructing Citizens Conservation Camps at Pickens and at Rutledge, to Stivers Lumber Co., Cleveland, Tenn., $33,000.

Ia., Cedar Falls — State Bd. Educ., general contract men's dormitory, at Iowa State Teachers College, to Larson & Sons, Council Bluffs, $112,000. O. Thomas, 1302 30th St., Des Moines, archt.

Mass., Essex — Town, R. E. Keller, supt. Schools, Manchester, heating plant for Rufus Choate School, to Robert Robertson Co., 220 Rantoul St., Beverly, $7,393. Bids June 12, awarded June 14. Noted June 5, C. D.—Apr. 18, E. N.-R.

Mass., Quincy—City, Public Buildings, Dpt. City Hall, 3 story, basement, 114x118 ft., brick, stone addition to Junior and Senior High School, concrete found., to A. Piotti Co., 708 Dudley St., Dorchester, $342,990. Bids June 6, awarded June 18. Noted June 11, 1935, C. D.—July 26, 1934, E. N.-R.

Mo., St. Louis — Atlas Constr. Co., general contractors, 817 North 9th St., grading and excavating for 1 story, 60x63 ft., brick addition to Booker T. Washington Vocational School, 814 North 19th St., for Bd. Educ., 911 Locust St., to J. E. Connelly Excavating Co., 841 Rosedale St.***concrete work, to H. A. Dailey Contrg. Co., 4108 Clayton St.***cut stone, to Pickel Stone Co., 1320 South Vandeventer St.***brick work, to George Fuhler, 4220A West Chippewa St.***iron and steel, to Gerst Bros. Mfg. Co., 800 Cass Ave.***sheet metal, to Old Orchard Sheet Metal Wks., 642 Big Bend Blvd.***roofing, to South St. Louis Slate & Tile Roofing Co., 6147 Manchester St.***plastering, to E. C. Ehlen, 2931 A Green St.***painting, to A. F. Koedding, Jr., 5611 Wabada St.***glazing, to Pittsburgh Glass Co., 3900 Chouteau Ave.***linoleum, to Stix, Baer & Fuller, 6th St. and Washington Ave.***millwork, to North St. Louis Planing Mill Co., 3616 Carter Ave.***screens, to Zumwalt Co., 1617 Lafayette Ave.***plumbing, to Mid-City Plumbing Co., 3923 Washington St.***heating, to R. A. Parkinson, 5118 Plam St.***electrical work, to S. C. Sachs, Inc., 817 North 9th St.***steel sash, to Truscon Steel Co., Mart Bldg.***precast slabs, to Federal American Cement Tile Co., Louderman Bldg. **P.W.A.** Noted May 24, C. D.

Neb., Monroe — Loup River Public Power Dist., 2307 13th St., Columbus, power plant, to W. J. Assenmacher Co., 625 North 17th St., Lincoln, $292,936. **P.W.A.** Bids May 24. Noted May 31, C. D.—May 2, E. N.-R.

N. J., Red Bank—Bd. Educ., Red Bank Twp., general contract school, River St., to Riccardi Constr. Co., 346 North 6th St., Newark, $32,-645***altering and constructing addition school on Mechanic St., to C. S. Rollerson, 400 Wachung Ave., Plainfield, $55,990***plumbing for same, to W. C. Bittner, 2015 Hamilton Ave., Trenton, $2,778***heating for same school and for River St. School, to E. J. Wohrle, Inc., 745 Palisade Ave., Cliffside, $15,990 and $9,190 respectively***electrical work for both schools, to A. N. Meister, 401 South 15th St., Newark, $5,052***steel for both schools, to Selbach Meyer Corp., 601 22nd St., West New York, N. J., $8,216. Grand total $129,816. **P.W.A.** Bids June 4. Noted June 10, C. D.

N. Y., Brooklyn — Dpt. Hospital, Municipal Bldg., New York, heating and ventilating for Greenpoint Hospital, Outpatients Buildings, to Dierks Heating Co., Inc., 210 East 31st St., New York, $31,340. **P.W.A.** Noted Mar. 29, C. D.—Apr. 4, E. N.-R.

N. Y., Castile — Bd. Educ., plumbing and drainage for school, to Wright & Alexander, 212 Otsego St., Rochester, $3,308***heating and ventilating, to G. Zolitsch, 123 Grape St., Buffalo, $11,489***electrical work, to F. C. Vickers, c/o Co-Operative Electric Shop, 59 South Main St., Ferry, $4,285. Grand total $19,082. **P.W.A.** Bids Mar. 23. Noted Apr. 1, C. D., under "Contracts Awarded."

N. Y., East Utica—Bd. Educ., millwork for high school, to W. A. Williams & Sons, Inc., Utica, $19,846. **P.W.A.** Noted May 10, C. D.—May 16, E. N.-R., under "Contracts Awarded."

N. Y., Jamaica — Dpt. Hospitals, Municipal Bldg., New York, Class A lighting fixtures, for Queens General Hospital, to Weiss DeVeau Co., Inc., 1333-5 Fulton St., Brooklyn, $5,980***Class B lighting fixtures, to Simes Co., Inc., 22 West 15th St., New York, $5,980. **P.W.A.** Noted Aug. 20, C. D.—Aug. 23, under "Contracts Awarded."

N. Y., Machias—Sycamore Lumber Co., general contractors, 35 Lathrop St., Buffalo, structural steel for school, to Ernst Iron Wks., 75 Lathrop St., Buffalo; steel joists for floor construction, to Concrete Steel Co., Durston Bldg., Syracuse, for School Bd. Machias **P.W.A.** Noted Apr. 22, C. D.—Apr. 25, E. N.-R. under "Contracts Awarded."

N. Y., Newark—Dpt. Mental Hygiene, State Office Bldg., Albany, electric elevators and dumbwaiters for Newark State School, to Graves Elevator Co., 280 Lyell Ave., Rochester, $14,465; refrigeration, to Chapin-Owen Co., Inc., 205 St. Paul St., Rochester, $1,176. **P.W.A.**

N. Y., Truxton — Bd. Educ., heating and ventilating for school, to D. C. Group Co., 204 Erie Blvd., East Syracuse, $21,034. **P.W.A. (Correction**—name of contractor.) Noted Feb. 26, C. D.—Feb. 28, E. N.-R., under "Contracts Awarded."

O., Columbus—Dpt. Welfare, State Office, 2 story, basement, brick, concrete tuberculosis cottage, at Hawthorndon Farm, Cleveland State Hospital, to Robert H. Evans & Co., $120,595. **P.W.A.** Bids June 15. Noted Dec. 28, C. D.—Jan. 3, E. N.-R.

†O., Portsmouth—Treas. Dpt. at office Sup. Archt., Wash., D. C., general contract U. S. Post Office, to Roche, Connell & Laub Co., Shaw and Wasson Sts., Cincinnati, $19,740. Former contract cancelled. Bids Nov. 30. Noted Dec. 27, C. D.—Jan. 3, E. N.-R., under "Contracts Awarded."

†Okla., Fort Reno—U. S. Eng., Fort Sill, 12 unit Citizens Conservation Camp buildings, to T. J. Ryan, Mena, Ark., $17,940. Est. $20,000. Awarded June 12.

†Okla., Fort Sill—Con. Q. M., constructing 12 unit Citizens Conservation Camp buildings, to C. Cochrane, Graham, Tex., $17,650. Est. $20,000. Awarded June 12.

†Okla., Wright City — Con. Q. M., Fort Sill, 12 unit Citizens Conservation Camp buildings, to O. C. Buschow, Mena, Ark., $16,417. Est. $20,000. Awarded June 12.

Pa., Mayview — City Controller, City-County Bldg., Pittsburgh, constructing additions to male and female mental buildings, North 2 and South 2, near Pittsburgh, for City of Pittsburgh, general contract, to William S. Miller Co., 2565 5th Ave., Pittsburgh, $249,000***plumbing, to J. A. Galbreath, 606 Herron Ave., Pittsburgh, $32,750***heating, to Campbell, Huggins & Donat, 119 Meyran Ave., Pittsburgh, $15,167***electrical work, to Fort Pitt Electric Co., 600 2nd Ave., Pittsburgh, $14,888*** elevators, to Westinghouse Elevator Co., Gulf Bldg., Pittsburgh, $12,822. Grand total $324,-627. Bids May 21, awarded about June 12. Noted May 21, C. D.

†Pa., Phila. — Treas. Dpt. at office Sup. Archt., Wash., D. C., furnishing, installing metal window grilles, to Crown Iron Wks., 1229 Northeast Tyler St., Minneapolis, Minn., $4,400.

Tenn., Nashville—Bd. P. Wks., Fire Hall 1, 1212 3rd Ave. N., and Firehall 10, 3rd Ave. N. and Gay St., to N. Yearwood, Woodlawn Dr., $25,775 and $19,490 respectively***Firehall 4, 416 Woodland St., and constructing storage garage at Central Alarm Station, to W. R. Smith & Son, Cotton State Bldg., $25,944 and $4,094 respectively***Firehall 7, 17th Ave. South and Broad St., to J. Morris, 151 5th Ave. N., $23,400***Firehall 13, 4406 Charlotte Ave., to Foster & Creighton, Amer. Natl. Bank Bldg., $26,944***additions to Firehalls 14 and 15, to J. Moore, 151½ 4th Ave. N., $6,399 and $5,563 respectively. Grand total $137,609. **P.W.A.** Bids June 12. Noted May 31, C. D.—May 16, E. N.-R.

†Va., Fort Myer—U. S. Eng., constructing ambulance garage, to H. S. Ward, 1402 Spring Rd., Wash., D. C., $3,800.

COMMERCIAL BUILDINGS

PROPOSED WORK

Conn., New Britain—Italia., Roman Catholic Parish, P. Denugse, chn. Building Comn., 84 Spring St., bids in fall, 1 story, basement, 35x 150 ft., brick, stone church, North Ave. $105,-000. A. De Pace, 151 West 45th St., New York, archt. Noted Feb. 16, 1933, C. D.—Feb. 23, 1933, E. N.-R.

Conn., New Haven — St. Thomas Episcopal Parish, R. S. Flockhart, pastor, revised plans

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Commercial Buildings (Continued)

by Allen & Collen, 75 Newbury St., Boston, Mass., 1 story, basement, irregular sized, brick, granite church, Whitney Ave, $105,000. Bids June 6 rejected. Noted May 28, C. D.—June 6, E. N.-R.

Fla., Miami Beach—J. L. Patten, Chicago, Ill., and 5800 Collins Ave., plans by R. E. Collins, 901 N.W. 46th St., Miami, and Thomas E. Lamb, 701 7th Ave., New York, assoc. archts., 4 story, 61x147 ft., brick, rein.-con. theater and medical arts building, concrete pile found., Collins Ave. $150,000.

Fla., Miami Beach—Robertson & Patterson, News Tower Bldg., Miami, archts., soon let contract 5 story, 52x108 ft., stucco, rein.-con. hotel, wood pile found., Ocean Dr., for J. C. Devine Properties, Washington Ave. $120,000. Jorgensen & Shreffler, News Tower Bldg., Miami, engrs.

Ga., La Grange—Dr. E. Callaway and Dr. R. S. O'Neal, chn., La Grange, plans by Daniel & Beutell, Georgia Savings Bank Bldg., Atlanta, 2 and 3 story, 40x200 ft., and 40x60 ft. wing, brick, cast stone, steel hospital. $165,000.

Ga., Macon—Mercer College, Macon, c/o Dr. S. Dowell, pres., plans brick, cast stone dormitories at Mercer College, $300,000.

Ga., St. Simons Island — A. A. Lacazette, Bronxville, and Morgan Wynnes, c/o Wynne Cable, St. Simons Island, plans 60 room hotel and club on Ocean Front, incl. boardwalk, seawall, etc. $200,000.

Ia., Mount Vernon—Cornell College, H. G. Burgstahler, pres., plans men's dormitory. $140,000.

Mass., Amherst — Amherst College, C. A. Andrews, pres., plans by McKim, Mead & White, 101 Park Ave., New York, J. K. Smith, in charge, 1 story, basement, 75x100 ft. gymnasium. To exceed $150,000. **Maturity about Sept. 1.** Owner may award without competition. Noted June 26, 1934, C. D.—June 28, 1934, E. N.-R.

Mass., Mattapan (sta. Boston)—St. Angela's Roman Catholic Church, F. J. Ryan, pastor, 11540 Blue Hill Ave., plans by R. Shaw, 25 Huntington Ave., Boston, brick, stone parochial school, concrete found., Blue Hill Ave. To exceed $150,000.

Mass., Monterey—Gould Farm Institution, S. W. J. Gould, pres., Monterey, plans by H. C. Pelton, 415 Lexington Ave., New York, 2½ story, basement, 33x120 ft., tile, stucco dormitory, concrete found., Gould Farm. $125,000 up.

Mich., Detroit—University Theater Co. plans completed by H. A. Payne, Livernois Ave. and McNichols Rd., 2 story, part basement, 2,000 seating capacity, brick, rein.-con. steel theater, plain found., Livernois Ave. Approximately $120,000. Construction to be done under supervision of architect.

N. Y., Beechhurst—Beechhurst Homes, Inc., 15th Ave. and 163rd St., plans by A. Faber, 39-44 51st St., Woodside, group 10 or more dwellings, 15th Ave. and 163rd St. To exceed $100,000.

N. Y., Brooklyn—Seventy-One Ocean Parkway Corp., 901 80th St., plans by Cohn Bros., 191 Joralemon St., 6 story, apartment, 79 Ocean Parkway. $275,000.

N. Y., Brooklyn—M. Zink, 242 Jay St., plans by J. Carlin, c/o owner, altering heating, plumbing in 4 story, brick school, 242 Jay St. $65,000.

N. Y., Flushing—Flushing Hills, Inc., 163-19 Jamaica Ave., plans by L. Bright, 109-02 114th St., Jamaica, group dwellings, 145th Pl. and 15th Ave. $105,000.

N. Y., Flushing—Marlene Realty Corp., 3759 82nd St., Jackson Heights, plans by Wuest & Bailey, 3203 30th Ave., Long Island City, constructing 10 or more dwellings, Utopia Parkway and Northern Blvd. $105,000 or more.

N. Y., Flushing—Paramount Homes Corp., 50-30 Hollis Court Blvd., plans by J. Unger, 39-01 Main St., Flushing, group dwellings, 193rd St. and 53rd Ave. To exceed $105,000.

N. Y., Forest Hills—Stafford Associates, 67-86 Selfridge St., plans by A. A. Allen, Garden City, group of 50 dwellings, 22nd St. and 115th Rd.

★ **N. Y., Kew Gardens**—**East New York Savings** Bank, Atlantic and Pennsylvania Aves., Brooklyn, plans by B. Braunstein, 163-18 Jamaica Ave., Jamaica, 6 story, 116x434 ft. apartment, Metropolitan Ave. and Park Lane. $750,000.

N. Y., Kingston—Big Indian Assn., c/o J. H. Cruickshank, 25 West 45th St., New York, plans tract development and dwellings, Big Indian Preserve. To exceed $100,000.

N. Y., Long Island City—J. Seligman, 55 Spruce St., plans by A. Eccles, 1 Bridge Plaza, group 2 story dwellings, 42nd St. and Skillman Ave. $100,000 or more.

N. Y., Long Island City—Society of Phipps Houses, 51-01 39th Ave., or c/o C. Stein, archt., 56 West 45th St., New York, plans 4 story apartment, Barnett Ave. from 50th to 52nd Sts. $420,000.

N. Y., Long Island City—Winston Realty Co. plans constructing group 20 or more dwellings, Cambria Ave. and Marathon Parkway. $100,000 or more. Private plans.

N. Y., Malverne—R. H. Johnson, plans developing 20 acre tract incl. dwellings, Nassau Co. To exceed $200,000. Site acquired.

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N. Y., Massapequa—Allenhaight Realty Co., A. T. Haight, pres., plans by R. C. Lafferty, c/o owner, 5 story apartment, Bway. and Massapequa Ave. To exceed $105,000.

N. Y., New York—Jewish Teachers Seminary and Peoples University, 427 Lafayette St., plans college class building. To exceed $125,000. Campaign for funds in progress. Architects not appointed.

N. Y., New York—Barnett and Nathan House, 301 East 38th St., plans by Aaronson & Heidrich, 32 Bleeker St., altering heating, plumbing in two 5 story apartments, 323 East 37th St. $32,000 or more.

N. Y., New York—Corporation, c/o D. Markbreither, 291 East 134th St., plans by G. G. Miller, 10 West 47th St., 6 story, brick apartment, 119 Payson Ave. $175,000.

N. Y., New York—Park Lane Corp., 299 Park Ave., plans by Schultze & Weaver, 18 East 48th St., altering heating, plumbing in 14 story hotel, 299 Park Ave. $50,000.

N. Y., Queens Village—Southgate Eng. Corp., 207-20 Hillside Ave., plans group 2 story, 25x25 ft. dwellings, 207th St. and 89th Ave. To exceed $100,000.

N. Y., Queens Village—Sunlind Homes, 1684 Carroll St., Brooklyn, plans by A. Allen, Garden City, group 25 dwellings, 59th Ave. and 142nd St. To exceed $105,000.

N. Y., Rochester—Colgate Rochester Divinity School, South Goodman St., bids in July or later constructing chapel, dormitory and missionary home, on campus, Highland Parkway, $105,000. S. Fitch, chn. Building Comn., will supervise construction. James Gamble Rogers, 156 East 46th St., New York, archt. Noted May 5, 1933, C. D.—May 11, 1933, E. N.-R.

N. Y., Whitestone—Opportunity Homes, Inc., 401-5 81st St., Jackson Heights, plans by J. Unger, 39-01 Main St., Flushing, 2½ story dwellings, 14th Ave. and 146th St. $105,000 or more.

O., Cincinnati—**Meyers Y. Cooper Co.**, 2949 Erie Ave., plans by W. Franklin, c/o owner, and soon takes bids group of dwellings, Hyde Park. $100,000 or more.

Ont., Ottawa—S. Milber, 287 Clemow Ave., plans by W. E. Noffke, 46 Elgin St., 3 and 4 story, basements, brick, apartment, plain found., Lisgar and Cooper Sts. $180,000.

Que., Montreal—Soeurs De la Congregation plans by Gascon & Parent, 934 St. Catherine St. E., and takes bids in July constructing convent and school, Joliette Ave.

Que., Sennetterre — Sisters of the Sacred Hearts of Jesus and Mary plans by Arnyot, Bouchard & Rinpet, 126 St. Peter St., Quebec City, brick, steel convent, concrete found.

BIDS ASKED

N. Y., East Hempstead — See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

Wis., Fond du Lac—E. Brielmaier & Sons Co., archts., 735 North Water St., Milwaukee, taking bids by invitation, 6 story, 58x161 ft., brick, steel, concrete addition to convent, 1 story, 15x110 ft. refectory wing, four 7x110 ft. open concrete porches, 1 story, 16x16 ft. penthouse, 2 story, 39x45 ft. chaplains home, 25x26 ft. garage wing, 1 story, 9x170 ft. cloister, solid brick walls, for St. Agnes Convent.

Wis., Milwaukee—Kirchoff & Rose, archts., 710 North Plankington Ave., taking bids concrete, masonry and structural steel work for remodeling theater into store and office building for Schlitz Brewery, West Wisconsin St. Total est. $250,000.

CONTRACTS AWARDED

Conn., Danbury—H. Wales Lines Co., general contractors, 134 State St., Meriden, plumbing for 1 story, basement, 45x85 ft. and 35x65 ft., brick, stone church, for Church of Christ Parish, E. H. Barnum, chn. Building Comn., to Lumb Temple Co., 387 Main St.***heating, to Winfield S. Holman, Inc., 26 Rose St.*** reinforcing steel, to Truscon Steel Co., 38 Chauncy St., Boston, Mass. Noted June 4, C. D.—June 6, E. N.-R.

Mass., Boston—C. F. Hovey Co., 33 Summer St., Boston, addition and alterations to present brick, stone, steel mercantile (department store) building, concrete found., Summer St., to Tredennick-Billings Co., 10 High St., Boston, to exceed $105,000. Noted May 27, C. D.—May 30, E. N.-R.

Mo., St. Louis — Kloster Co., general contractors, 5215 South Grand Blvd., brick work for remodeling 3 story, basement orphans home into boys high school, for Archdiocese of St. Louis Roman Catholic Church, J. J. Glennon, archbishop, 4510 Lindell Blvd., to Wegener Bricklaying Co., 3120 Nebraska St.***tuck pointing, to H. Lincks, 6061 Carlsbad St.*** steel stairs, to Central Wire & Iron Co., 309 Gratiot St.***metal toilet partitions and cork tack strips and bulletin boards, to August Court Co., 220 North 4th St.***terrazzo, to St. Louis Terrazzo & Marble Co., Inc., 4528 Oletha St.***medicine and asphalt tile floors, to Builders Specialty Co., Wainwright Bldg.*** glass and glazing, to Hadley Dean Glass Co., 703 North 11th St.***composition roofing, to J. Eckirch Roofing Co., 4516 South Compton St.***slate roofing, to O. C. P. Borger, 4355 West Pine Blvd.***millwork, to Messing Planing Mill Co., 2716 South 3rd St.***linoleum floors, to Stix, Baer & Fuller, 7th and Washington Sts. Noted May 20, C. D., under "Contracts Awarded."

N. Y., East Hempstead — Hempstead [illegible] stead Corp., A. Bailey, pres., constructing [illegible] unit) group dwellings, Front St. and [illegible] stead Turnpike, separate contracts awa[illegible] To exceed $120,000.

N. Y., Interlaken—W. B. Ford, 904 [illegible] Home, Ann Arbor, Mich., residence on [illegible] of Seneca Lake, separate contracts [illegible] awarded soon. $105,000. O. Dell, Depart[illegible] of Architecture, University of Mich., archt.

N. Y., New York—**Associates Corp.**, I. [illegible], pres., 165 Bway., altering 5 story, apart[illegible] incl. new elevator, boiler, etc., 190 W[illegible] Pl., to World Contg. Co., 2116 Ditmas [illegible] Brooklyn. Est. $35,000. Noted May 29, [illegible] —June 6, E. N.-R.

N. Y., New York—Bank for Savings, [illegible] of New York, altering, heating, plumbing [illegible] story apartment, 106 East 81st St., sep[illegible] contracts. $50,000. L. E. Ordwein, 280 [illegible] Ave., archt. Noted May 29, C. D.—Jun[illegible] E. N.-R.

N. Y., New York—Eleven West 94th [illegible] Corp., I. Broff, pres., 111 West 96th St., [illegible] story storage and apartment, 115 West [illegible] St., separate contracts now being awar[illegible] $130,000. S. Bain, 415 Lexington Ave., archt.

N. Y., New York—Excelsior Savings Bank, 221 West 57th St., boiler flues, heating, etc., in three 5 story apartments, 151 West 63rd St., to Hopper Constr. Co., 6 East 45th St. Est. $28,000. J. M. Berlinger, 17 East 49th St., archt. Noted May 29, C. D.—June 6, E. N.-R.

N. Y., New York—**Lonygon & Morant**, 1082 Madison Ave., altering heating, plumbing in 5 story, basement apartment, 24 East 82nd St., separate contracts. $30,000. H. P. Jaenike, 1142 Madison Ave., archt.

N. Y., New York—Three Hundred Fifty-Three East 53rd St., Inc., J. Silverman, pres., 785 Madison Ave., 6 story, apartment, 965 1st Ave., separate contracts now being awarded. $190,000. L. Margon, 110 East 42nd St., archt. Noted May 29, C. D.—June 6, E. N.-R.

N. Y., Oswego — St. Pauls Roman Catholic Church, general contract school, to Avon Constr. Co., 1108 South State St., Syracuse, approximately $110,000. Bids June 4. Noted June 10, C. D.—May 23, E. N.-R.

N. Y., Port Dickinson — St. Ann's Roman Catholic Church, Prospect St., constructing church. Owner builds. A. J. Matus, in charge, 118 Schubert St., Binghamton, awards contract for structural steel, to Genesee Bridge Co., Rochester. Total est. $105,000. Gordon & Kaelber, 311 Alexander St., Rochester, archts. Noted May 9, C. D.—May 16, E. N.-R., under "Contracts Awarded."

N. Y., Syracuse — William Ballard, Inc., general contractors, City Bank Bldg., masonry work for railroad station, to Edison Concrete Co., 250 East 53rd St., New York, for New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York. Noted June 5, C. D.—June 13, under "Contracts Awarded."

N. Y., Syracuse—William Ballard, Inc., general contractors, City Bank Bldg., structural steel for railroad station, to McClintic Marshall Corp., Bell and Abby Sts., Buffalo, for New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York. Noted June 5, C. D.—June 13, E. N.-R.

Va., Norfolk—New Granby Theater, air conditioning theater, separate contracts now being awarded. To exceed $28,000. Refrigeration equipment, to York Ice Mchy. Co., York, Pa.

Wis., Marshfield — St. Joseph's Hospital, general contract 4 story, basement, 40x48x120 ft., brick, steel hospital, to Hutter Constr. Co., Fond du Lac. Noted Jan. 8, C. D.—Jan. 10, E. N.-R.

Ont., Timmis—Timmis Theater Ltd., L. Mascioli, pres., structural steel for theater, 3rd Ave., to Sarnia Bridge Co. Ltd., Sarnia. Est. $175,000. Owner taking bids for various trades.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Modesto—WINERY—J. H. Defosset, et al, 203 Park St., plans fireproof winery, Golden State Hy. To exceed $40,000.

Calif., San Diego — BREWERY — San Diego Brewing Co., plans improvements to former San Diego Consolidated Brewery Plant. $100,000.

Calif., South San Francisco — PACKING PLANT—Armour & Co., Union Stockyards, Chicago, Ill., plans packing plant and additions. $40,000.

Fla., Avon Park—PACKING PLANT—G. and J. Maxcy Packing Co. plans packing plant. To exceed $30,000. Architect not appointed.

Fla., Graceville—COTTON GINNING, etc.—J. L. Kirkland plans cotton ginning and storage plant. To exceed $30,000. **Maturity indefinite.** Architect not appointed.

Idaho, Pocatello — BREWERY — East Idaho Brewing Co. plans brewery. $150,000 with equipment.

Ill., Chicago—PLANT—Air Reduction Sales Co., 348 South Homan Ave., plans by B. R. Klekamp, 140 South Dearborn Ave., plant addition. $100,000.

Ind., Kokomo—PLANT—Crosley Radio Corp., 1329 Arlington St., Cincinnati, O., plans altering former Dirigold Co. plant into refrigerator manufacturing plant. $28,000 or more.

Ind., Kokomo—PLANT—Kingston Products Co. plans plant addition. $28,000 or more.

†*Federal Government.*

Industrial Buildings (Continued)

Kan., Kansas City—GRAIN ELEVATOR—St. Louis & San Francisco R. R., 902 Olive St., plans rebuilding grain elevator. Fire loss $100,000. **Maturity indefinite.** Architect not appointed. Lathrop-Marshall Grain Co., Bd. Trade Bldg., Kansas City, Mo., lessees.

Md., Amcelle — MILL — Celanese Corp. of America, 180 Madison Ave., New York, plans addition to mill. To exceed $150,000 with equipment. C. F. Beran, 180 Madison Ave., New York, in charge.

★ **Mass., Cambridge**—WAREHOUSE PRODUCE MARKET—Boston Regional Produce Market, Inc., L. S. Ollis, genl. mgr., 131 Lexington St., Waltham, plans by Monks & Johnson, archts. and engrs., 99 Chauncy St., Boston, produce market, Concord Ave. and Alewife Parkway. $1,000,000. Noted May 9, C. D. — May 16, E. N.-R.

Mass., East Boston (Sta. Boston) — BULK STORAGE PLANT—Sun Oil Co., 1608 Walnut St., Phila., Pa., plans 125,000 bbl. storage tanks, office, pumphouse, fire protection system, etc., Chelsea St. Private plans by W. A. Courtney, 1608 Walnut St., Phila., Pa., company's engineer.

Mass., Rockland — WAREHOUSE, etc. — A. Goldberg, 89 State St., Boston, plans by Blackall, Clapp, Whittemore & Clark, 31 West St., Boston. 2 story, brick, frame warehouse, store and apartment, concrete found. To exceed $40,000. J. J. Newberry Co., 245 5th Ave., New York, lessee.

Mich., Detroit—FOUNDRY—Chrysler-De Soto Motor Corp., 12200 East Jefferson Ave., plans 1 story, brick, steel, plain found., East Jefferson Ave. Approximately $100,000. Private plans.

Mich., Detroit—GARAGE—Owner, c/o M. R. Burrowes, archt., 415 Brainard St., plans 1 story, part basement, 172x226 ft., brick, steel, rein.-con. fireproof garage, plain found., Woodward and Ferry Aves. $110,000.

Mich., Lansing—STILLS, etc.—Dow Haggett, St. Johns, plans stills for peppermint oil extration and drainage of swamp acreage, 40 acres or more, for growing peppermint, on U. S. Hy. Route 127, 6 mi. from here. To exceed $17,500. **Mich., Muskegon** — TANNERY — Fleckinstein Tannery plans tannery. To exceed $30,000. **Maturity indefinite.** Architect not appointed.

Mich., Salzburg — GASOLINE REFINERY — Corporation, c/o D. Fortney, Mt. Pleasant, plans gasoline refinery. $300,000.

Mo., Kansas City — CREAMERY — Harding Cream Co., 2327 Penn St., plans by C. A. Smith, 800 Finance Bldg., Kansas City, creamery plant, 60,000 sq.ft. floor space, 19 and Forest Sts. $75,000.

Mo., St. Louis—SERVICE STATION—Laclede Gas Light Co., E. P. Gosling, pres., 1017 Olive St., soon lets contract 1 story, basement, 60x80x 120x170 ft. central service station, incl. air conditioning, 3950 Forest Park Blvd. Mauran, Russell & Crowell, 1620 Chemical Bldg., archts.

Mont., Butte—ORE MILL—Basin Tunnel Co., Butte, plans ore mill addition. $30,000 or more.

Mont., Twin Bridges — ORE MILL, etc. — Manmmouth Mines Corp., E. R. Pulver, pres., Twin Bridges, plans ore mill, mine development, tunnel, etc. Est. about $150,000.

Neb., Fremont — GRAIN ELEVATOR — Farmers Natl. Grain Corp., Grain Exch. Bldg., Omaha, plans repairing grain elevator. $50,000.

N. J., Newark — PLANT — Tung-Sol Lamp Wks., 1775 Bway., New York, N. Y., plans altering, equipping and constructing addition to former Banister shoe plant, 370 Orange St. To exceed $28,000.

N. Y., Albany—PLANT, etc.—Albany Coca Cola Bottling Wks., Inc., 1032 Bway., plans model bottling plant, automatic machinery, landscaping on 100x250 ft. site, Bradford St. To exceed $105,000. Private plans.

N. Y., Flushing—GASOLINE STATIONS and SHOP — J. Halleran, 63 Bway., plans by C. Stedolph, Elmhurst, service and gasoline stations, shop, Harding Blvd. and Rodman St., Harding Blvd. and Gilroy St., Harding Blvd. and Flushing River. To exceed $28,000.

N. Y., Gowanda—POWER PLANT—Moench Tannery, 265 Palmer St., making plans steam turbine, generators, boilers, automatic stokers, coal and ash handling machinery, L. A. Harding, Prudential Bldg., Buffalo, engr.

N. Y., Long Island City — OIL PLANT — Syndicate Oil Corp., 200 West 34th St., New York, plans bulk storage oil plant. $150,000.

N. Y., New York — STORAGE, etc. — F. W. Woolworth Co., lessee, 233 Bway., will award contract late in July, constructing 1 story storage and store, 2229 Bway. $55,000. A. E. Winters, 233 Bway., archt. L. A. Livingston, 835 Park Ave., owner. Noted May 29, C. D.—June 6, E. N.-R.

N. C., Middlesex—GRIST MILL—See "Unclassified."

N. D., Grand Forks—STORAGE, etc.—North Dakota Industrial Commissioner soon takes bids storage and feed plant. $36,000. J. B. DeRemer, Grand Forks, archt.

O., Akron—FACTORY—Quaker Oats Co. soon takes bids 2 story, 180x200 ft., brick, steel, concrete factory addition, Quaker St. $75,000. Private plans.

O., Cleveland — FACTORY — Elwell Parker Electric Co., M. S. Towson, pres.-genl. mgr., 4205 St. Clair Ave., plans by George S. Rider Co., archts. and engrs., Marshall Bldg., 1 and 2 story, brick, steel, rein.-con. factory addition. $40,000.

O., Cincinnati — STATIONS—Socony Vacuum Oil Co., 26 Bway., New York, soon lets separate contracts altering and rebuilding group gasoline stations at McMillan and Dover Ave., Reading Rd. and Seymour St., and other locations. To exceed $28,000. Private plans.

O., Coshocton — FACTORY — Pretty-Scheffer Co. plans 2 story, basement, brick, concrete, steel factory addition. $40,000. Private plans.

O., East Liverpool—FACTORY—Hall China Co. soon takes bids 2 brick, steel factory buildings, one 80x100 ft. and other 110x480 ft. B. H. Prack, Martin Bldg., N.S. Pittsburgh, Pa., archt.

Ore., Medford — COLD STORAGE — Pinnacel Packing Co., plans 3 story, basement, rein.-con., steel, cold storage plant. $100,000. Private plans.

Ore., Redmond—PLANING MILL—Redmond Box & Lumber Co. plans planing mill. To exceed $28,000 with equipment.

Wis., Milwaukee — GARAGE — Blochowiak Dairy, 2934 South 9th St., plans by F. S. Gurda, 733 West Mitchell St., 35x120 ft. garage and 20x20x10 ft. tank, 200 lin.ft. wall, South 9th St.

Man., Winnipeg — REFINERY — Barnsdall Refineries of Canada Ltd., plans new refinery. $50,000.

N. S., North Sydney — STORAGE PLANT — R. P. Bell plans cold storage plant, $50,000. Architect to be appointed soon.

Ont., Chatham—PLANT—Arid Cold Products Ltd., N. G. Sinclair, mgr., Workeville, plans dry ice machine manufacturing plant, etc. $100,000.

Ont., Galt—PLANT—Galt Wood Heel Ltd., W. H. Booty, mgr., plans plant to manufacture wooden heels for shoes, slippers and wooden specialties. $40,000.

Ont., Windsor—PLANT—Hewitt Metals Corp. Ltd., J. E. McKeon, mgr., plans smelting and refining plant, $40,000.

Sask., Kelliher—MILL—William Humphries preparing plans constructing flour mill and power plant.

Sask., Prince Albert — WAREHOUSE — National Fruit Co. Ltd. soon takes bids constructing warehouse. $50,000.

BIDS ASKED

Ga., Glennville—ICE PLANT—See "Contracts Awarded."

Idaho — GOLD MINING DEVELOPMENT — See "Contracts Awarded."

Nev., Goldfield—MINING DEVELOPMENT—See "Contracts Awarded."

N. Y., Interlaken—See "Contracts Awarded."

N. Y., Schenectady — PRINTING PLANT — Maqua Co., 946 Duane Ave., bids about July 15, printing plant, Duane Ave. $200,000. E. E. Talmadge, c/o General Electric Co., archt.

N. Y., Syracuse—July 2, by New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, constructing mail and express buildings, power plant, Howard St. $500,000. Work in connection with grade crossing elimination project. Noted May 15, C. D.—May 23, E. N.-R.

CONTRACTS AWARDED

Ark., Stuttgart — WAREHOUSE — Arkansas State Rice Milling Co., Stuttgart, 185,000 bu. warehouse, separate contracts awarded. To exceed $28,500.

Ark., Warren—SAW MILL—L. G. Hampton, Warren, saw mill, separate contracts awarded. $28,000 or more.

Conn., Branford—MILL, etc.—Atlantic Wire Co., Church St., elevator for 3 story, 80x125 ft., 80x155 ft., 1 story, 60x140 ft., brick, steel wire mill and warehouse, to Eastern Machine Co., 250 Ashmun St., New Haven***steel deck and floor plates, to W. Keenan, 30 Fairfield Ave., New Haven***structural steel, to McClintic-Marshall Corp., 25 Bway., New York*** masonry, to Mariani Constr. Co., 222 Forbes Ave., New Haven***steel erection, to Leake & Nelson Co., 203 Ash St., Bridgeport***steel sash, to Detroit Steel Products Co., 2250 Grand Blvd., Detroit, Mich.***overhead doors, to Overhead Door Co., 129 Whalley Ave., New Haven***elevator doors, to St. Louis Fire Door Co., 30 Whitney Ave., New Haven***reinforcing steel, to Kalman Steel Corp., 25 Bway., New York***cast stone, to Dextone Co., Chapel & Whalley Sts., New Haven. Noted May 31, C. D. —June 6, E. N.-R.

Conn., Startford — PLANT — Edwin Moss & Son, Inc., general contractors, 729 Union Ave., Bridgeport, reinforcing steel for 1 story, 100x 140 ft. and 60x100 ft., brick, steel plant additions, to Hunter & Havens, 239 Water St., Bridgeport, for Raybestos-Manhattan Inc., 1427 Railroad Ave., Bridgeport***structural steel, to American Bridge Co., 71 Broadway, New York ***electrical work, to Eastern Electric Constr. Co., 1208 Stratford Ave., Bridgeport. Noted June 4, C. D.—June 6, E. N.-R.

Fla., Jacksonville—FRUIT STORAGE—Seaboard Air Line Ry., Ft. Hogan St., W. D. Faucette, Norfolk, Va., ch. engr., 2 story, 90x110 ft. and 1 story, basement, 90 ft. x 148 ft. 6 in. storage buildings for fruit and produce, West Bay St., to C. V. York & Sons, 8 East Davie St., Raleigh, N. C. Arnold Fruit Co., and Harney Morrow Fruit Co. and Florida Fruit & Produce Co., lessees.

Ga., Glennville—ICE PLANT—Glennville Ice Co., 1 story, basement, brick, concrete, steel, day labor. $50,000. Private plans. Noted June 6, C. D.—June 13, E. N.-R.

Idaho — GOLD MINING DEVELOPMENT — Orogrande-Frisco Gold Mines, J. R. Moore, pres., Lewiston, or c/o National Co. of Idaho, Lewiston, mining development, near here, by day labor and separate contracts. To exceed $150,000. Noted May 31, C. D.—June 6, E. N.-R.

★ **Ill., Monsanto**—CHEMICAL PLANT—Monsanto Chemical Co., 1700 South 2nd St., St. Louis, Mo., general contract chemical plant addition, tanks, equipment and facilities to United Engineers & Constructors, Inc., 1401 Arch St., Phila., Pa. Est. $500,000 upwards.

Ind., Terre Haute—BREWERY—Terre Haute Brewing Co., Terre Haute, brewery improvements, incl. bottling plant, fermenting tanks, boiler house and equipment, separate contracts awarded; bottling plant equipment, to Liquid Carbonic Co., 3100 South Kedzie St., Chicago, Ill.***fermenting tanks, to Wendnagel Co., 600 West Cermak Rd., Chicago, Ill. Est. exceeds $28,500. Noted Oct. 30, 1933, C. D.—Nov. 2, 1933, E. N.-R.

Ky., Frankfort — WAREHOUSE — Leslie V. Abbott, archt., Louisville, awarding separate contracts for warehouse, for Kent Taylor Distillery Co., Frankfort. $125,000.

Md., Baltimore—WAREHOUSE—Krebs Pigment Corp., 2001 Benhill Rd., 4 story, 46x81 ft. warehouse, 2001 Benhill Rd. Owner builds. $40,000. Private plans.

Mass., Ayer — STORAGE — Nashoba Cold Storage Co., Inc., Ayer, 3 story, 70x125 ft., rein.-con., structural steel addition to fruit storage building, to George A. Fletcher & Co., 215 Blossom St., Fitchburg. Est. $75,000. Bids June 1, awarded June 14. Noted May 28, C. D. —June 6, E. N.-R.

Mass., Holyoke—BAKERY—Dreikorn Bakery, Inc., 320 Park St., bakery addition, Park St., to W. K. Traquair, 596 South St. Est. $50,000. Noted June 10, C. D.—June 13, E. N.-R.

Mass., Norwood—PLANT—Bird & Son, Inc., East Walpole, electrical work for 1 story, brick, steel plant, to J. Livingston & Co., Inc., 18 Oliver St., Boston. Noted May 22, C. D.—May 30, E. N.-R., under "Contracts Awarded."

Nev., Goldfield—MINING DEVELOPMENT—Goldfield Deep Mines Co., A. I. d'Arcy, pres., Goldfield, developing mining property, near here, day labor. To exceed $100,000. Noted May 29, C. D.—June 6, E. N.-R.

N. Y., Maspeth — FACTORY — Brown & Mathews, general contractors, 110 East 42nd St., 750 tons structural steel reinforcing for factory to R. T. Patterson & Co., 203 Woodside Ave., Jersey City, N. J., for National Can Co., Maspeth. Noted June 6, C. D.—June 13, E. N.-R., under "Contracts Awarded."

N. C., Charlotte—MANUFACTURING—Chevrolet Motor Co., Detroit, Mich., manufacturing and distribution plant, to Southeastern Constr. Co., 218 West 2nd St. Contractors awarded structural steel, to Southern Eng. Co., Little Pittsburgh, Charlotte. $175,000. A. Kahn, Marquette Bldg., Detroit, Mich., archts.

O., Cleveland—FACTORY, etc.—Harris Calorific Co., 2828 Washington St., 1 story, 200x250 ft., brick, steel, rein.-con. factory and office, 5500 Cass Ave., to Gillmore-Carmichael & Olsen, 1873 East 55th St. Est. $150,000. Noted June 6, C. D.—June 13, E. N.-R.

★ **O., Middletown**—COLD STEEL REDUCTION MILL—American Rolling Mill Co., C. Verity, vice pres., wide cold reducing steel mill buildings and foundations at company's East Works plant, to F. H. McGraw & Co., 51 East 42nd St., New York. Est. approximately $3,500,000. Noted May 9, C. D.—May 16, E. N.-R.

Pa., Schenley — WAREHOUSE — Joseph S. Finch & Co. Distillers, Schenley, 50,000 bbl. brick, steel warehouse, to Frank Messer & Sons, 2515 Burnet St., Cincinnati, O. Est. $500,000. Awarded May 20. C. J. Kiefer, Schmidt Bldg., Cincinnati, O., archt.

Tex., Houston — PLANT — International Harvester Co., 606 South Michigan Ave., Chicago, Ill., plant, to Knutson Constr. Co., Union Bank Bldg., Houston. Est. $100,000.

Tex., Lufkin—FOUNDRY—Lufkin Fdry. & Machine Co., Lufkin, addition, to Mosher Steel Co., 3910 Washington St., Houston. Est. $50,000. All separate contracts awarded.

Wash., Seattle—PLANT—W. P. Fuller Co., 301 Mission St., San Francisco, Calif., and 2nd and Jackson Sts., altering plant for paint and glass distribution, to Howard Eng. Co., 6740 Fox St. Est. exceeds $28,000. Noted Mar. 1, C. D.—Mar. 7, E. N.-R.

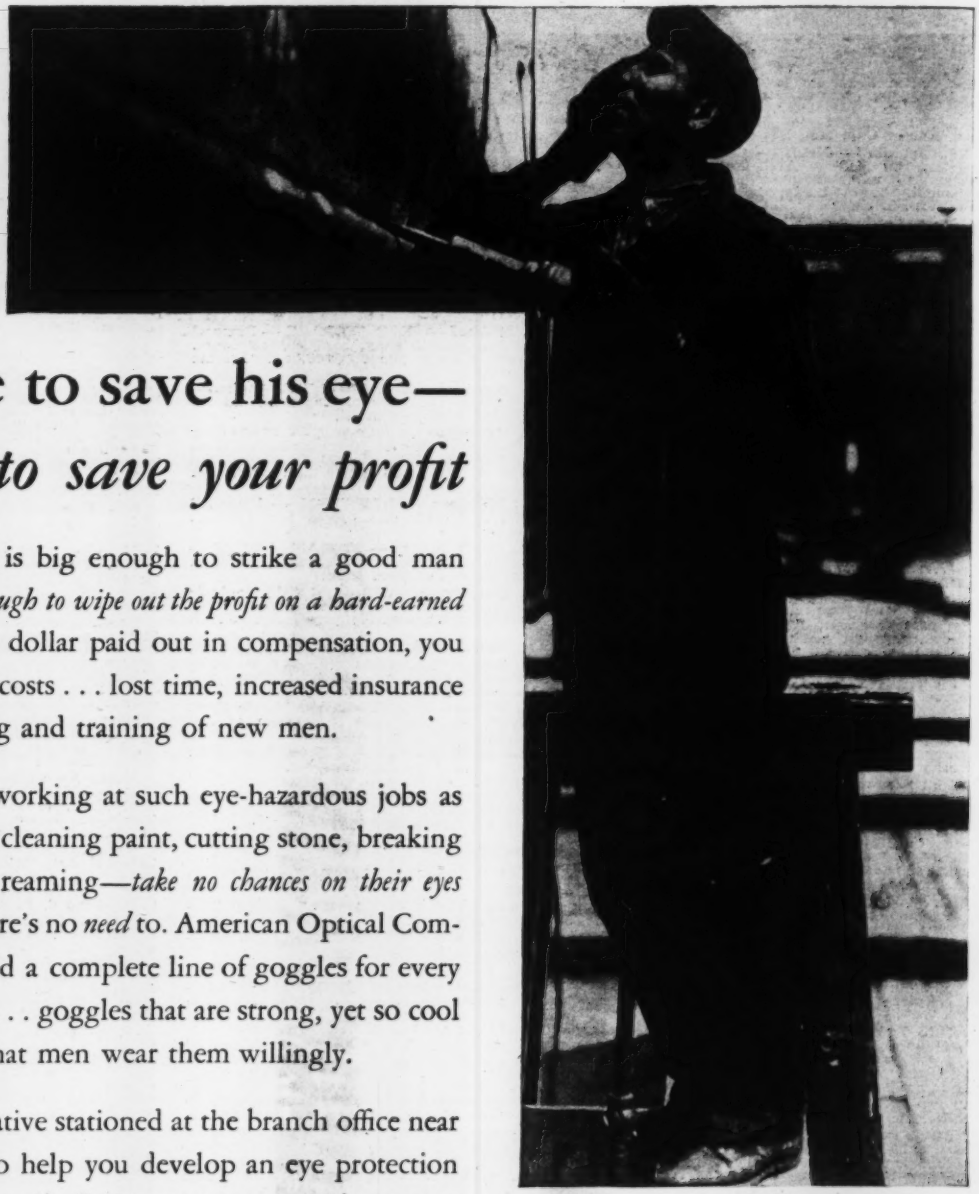
Wis., Milwaukee—GARAGE—Advance Transportation Co., 1462 North Water St., general contract 1 story, 120x140 ft., brick truck garage, plain found., North 6th St., to Siderits Constr. Co., 3805 North Green Bay St.

Wis., Milwaukee—SHOP—Harnischfeger Corp., 4400 West National Ave., 1 story, 60x200 ft., brick, steel hoist shop building, plain found., to Hunzinger Constr. Co., 1827 North 30th St. Noted June 7, C. D.—June 13, E. N.-R.

†*Federal Government.*

For official proposal advertising see Searchlight Section

Constr. News page 317



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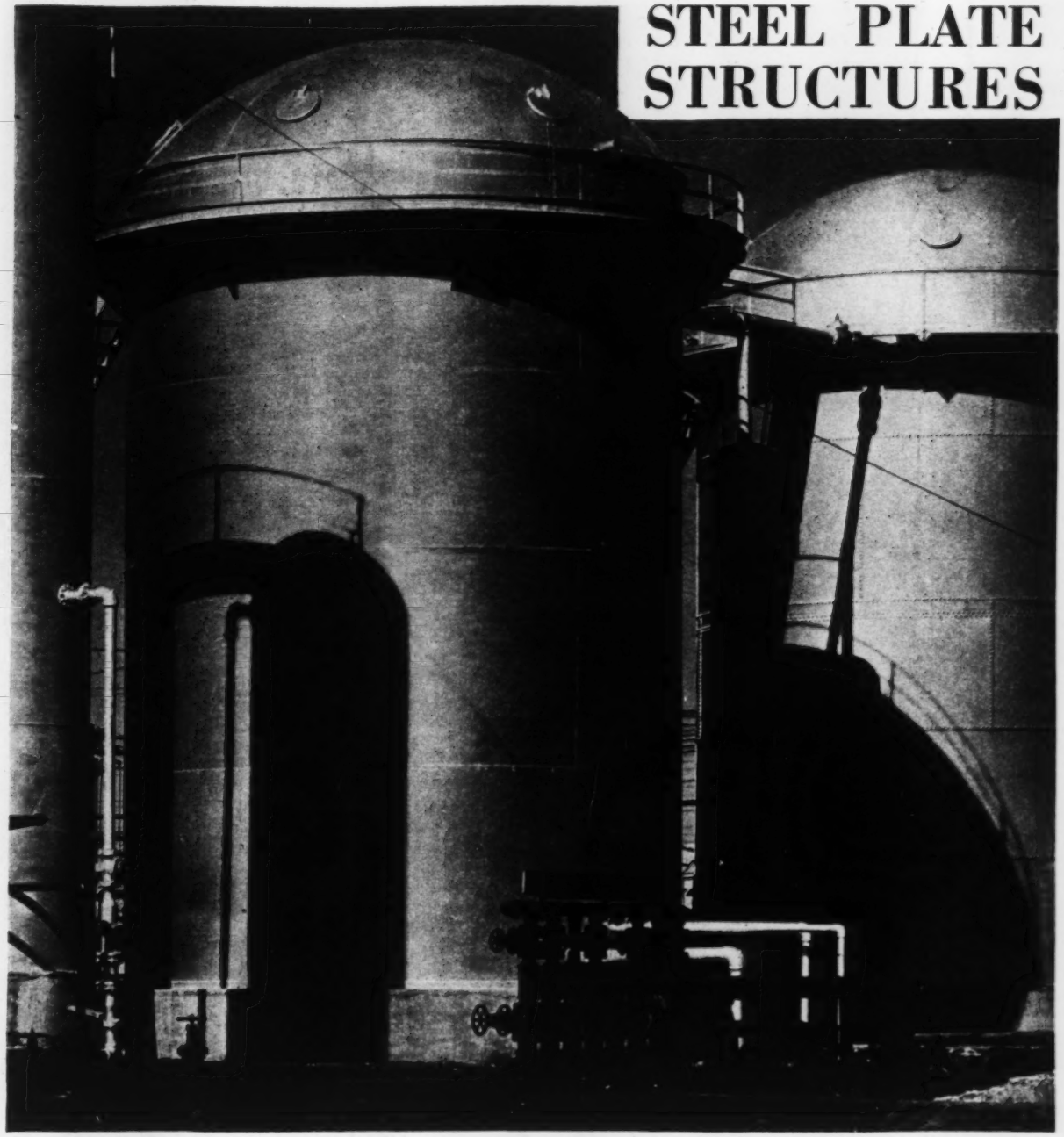

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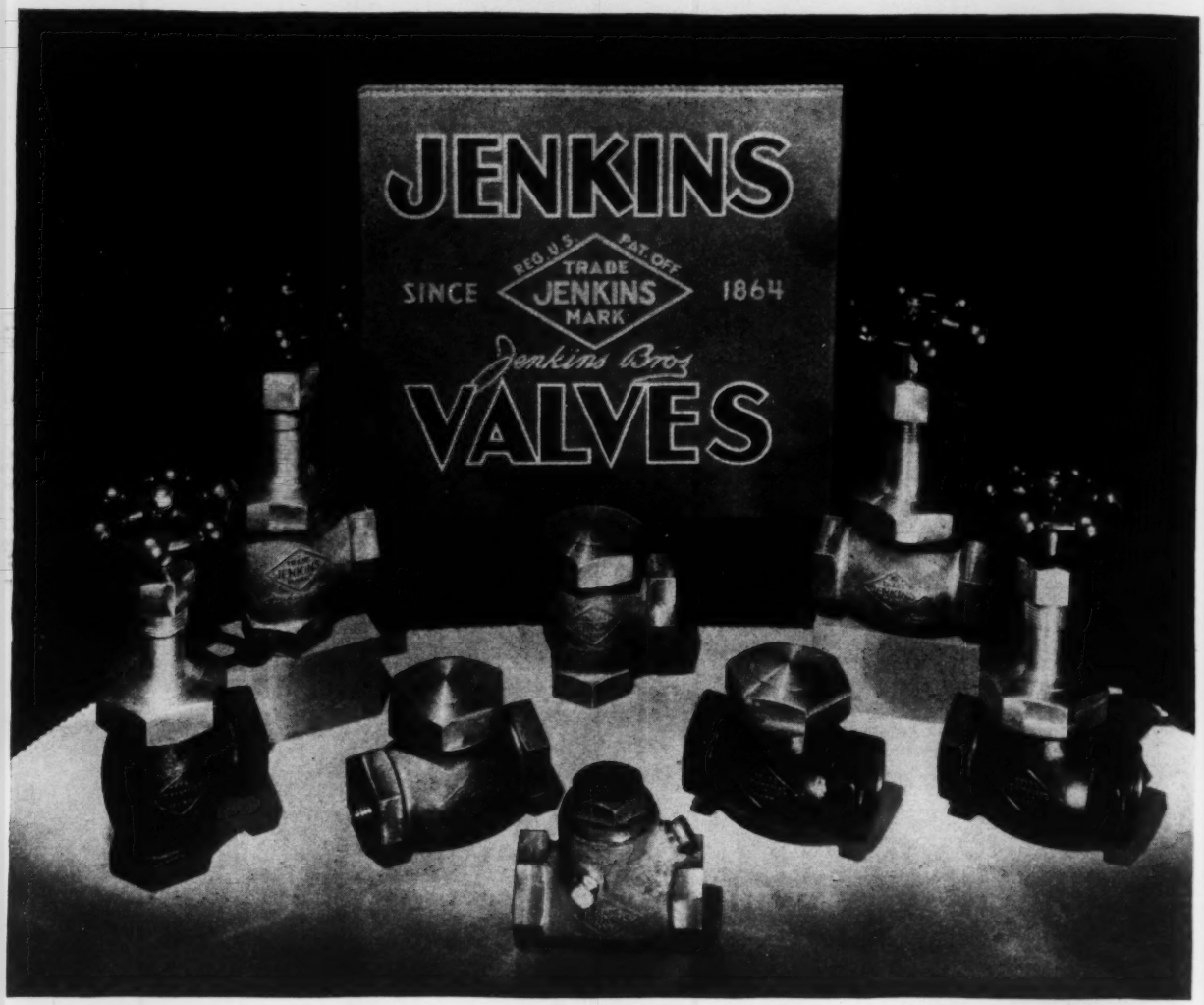

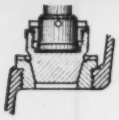

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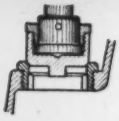

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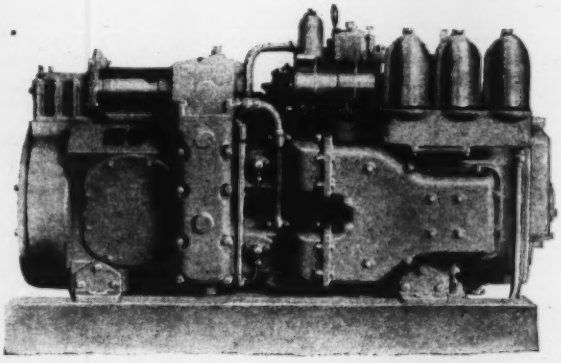

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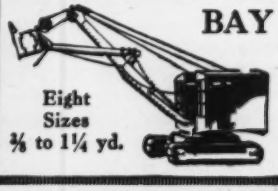

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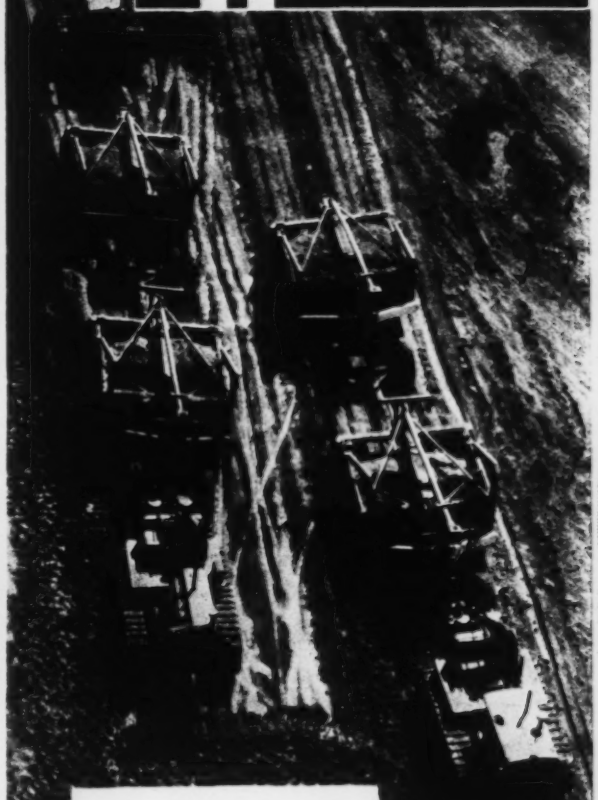

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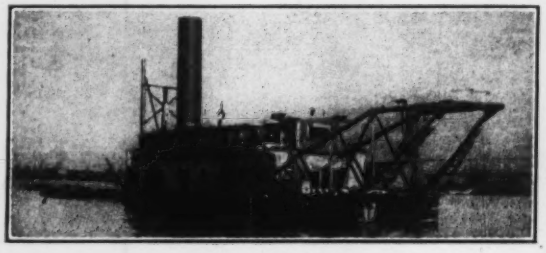

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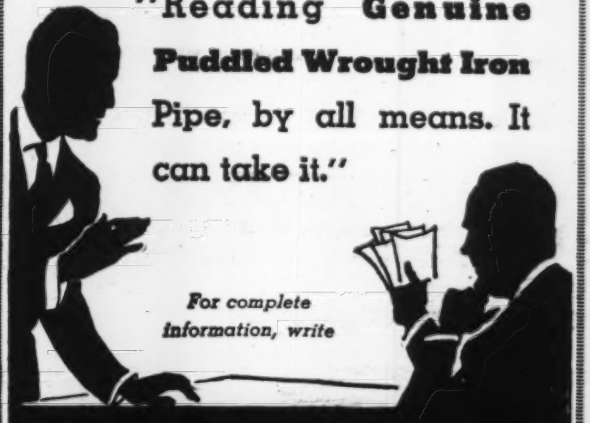

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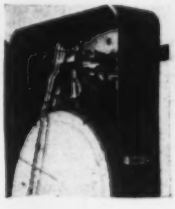

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OFFICIAL PROPOSALS

Bids: July 24.

Excavating in the Barge Canal

CONTRACT NO. U. S. 4

From Lock 19 to Lock 20, Frankfort to Whitesboro, New York

Sealed proposals for Contract No. U. S. 4, excavating in the Barge Canal from Lock 19 to Lock 20, Frankfort to Whitesboro, New York, will be received at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, until 2 P.M., Eastern Daylight Saving Time, Tuesday, July 24, 1935, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Excavating in the Barge Canal, Contract No. U. S. 4, from Lock 19 to Lock 20, Frankfort to Whitesboro, New York," and addressed to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the State of New York, or money, for not less than Five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in the sum of Fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y.; at the office of the District Engineer, 109 No. Genesee Street, Utica, N. Y.; at the office of the District Engineer, Weighlock Building, Syracuse, N. Y.; at the office of the District Engineer, Barge Canal Terminal, Rochester, N. Y.; at the office of District Engineer, 65 Court Street, Buffalo, N. Y., and at the office of the Department of Public Works, 80 Centre Street, New York, N. Y. Plans and specifications for this contract will be furnished by the CHIEF ENGINEER, DEPARTMENT OF PUBLIC WORKS, DIVISION OF ENGINEERING, STATE OFFICE BUILDING, ALBANY, NEW YORK, upon payment of $20.00. One half of this payment will be returned if the plans and specifications are returned in good condition to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, within two weeks after date of opening bids. The estimated cost of the work under this contract is $630,000.00.

DEPARTMENT OF PUBLIC WORKS,
T. F. FARRELL,
Chief Engineer.

June 19, 1935.

Bids: July 23.

Excavating in the Barge Canal

CONTRACT NO. U. S. 1

From Lock 13 at Yosts to Lock 16 at Mindenville, New York

Sealed proposals for Contract No. U. S. 1, excavating in the Barge Canal from Lock 13 at Yosts to Lock 16 at Mindenville, New York, will be received at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, until 2 p.m., Eastern Daylight Saving Time, Tuesday, July 23, 1935, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Excavating in the Barge Canal, Contract No. U. S. 1, from Lock 13 at Yosts to Lock 16 at Mindenville, New York," and addressed to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the State of New York, or money, for not less than Five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in the sum of Fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y.; at the office of the District Engineer, 109 No. Genesee Street, Utica, N. Y.; at the office of the District Engineer, Weighlock Building, Syracuse, N. Y.; at the office of the District Engineer, Barge Canal Terminal, Rochester, N. Y.; at the office of District Engineer, 65 Court Street, Buffalo, N. Y., and at the office of the Department of Public Works, 80 Centre Street, New York, N. Y. Plans and specifications for this contract will be furnished by the CHIEF ENGINEER, DEPARTMENT OF PUBLIC WORKS, DIVISION OF ENGINEERING, STATE OFFICE BUILDING, ALBANY, NEW YORK, upon payment of $20.00. One half of this payment will be returned if the plans and specifications are returned in good condition to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, within two weeks after date of opening bids. The estimated cost of the work under this contract is $700,000.00.

DEPARTMENT OF PUBLIC WORKS,
T. F. FARRELL,
Chief Engineer.

June 19, 1935.

Bids: July 24.

Excavating in the Barge Canal

CONTRACT NO U. S. 2

From Three Rivers to Lock 5, Minetto, New York

Sealed proposals for Contract No. U. S. 2, excavating in the Barge Canal from Three Rivers to Lock 5, Minetto, New York, will be received at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, until 2 P.M., Eastern Daylight Saving Time, Tuesday, July 24, 1935, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Excavating in the Barge Canal, Contract No. U. S. 2, from Three Rivers to Lock 5, Minetto, New York," and addressed to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the State of New York, or money, for not less than Five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in the sum of Fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Chief Engineer, Department of Public Works, Division of Engineering State Office Building, Albany, N. Y.; at the office of the District Engineer, 109 No. Genesee Street, Utica, N. Y.; at the office of the District Engineer, Weighlock Building, Syracuse, N. Y.; at the office of the District Engineer, Barge Canal Terminal, Rochester, N. Y.; at the office of District Engineer, 65 Court Street, Buffalo, N. Y., and at the office of the Department of Public Works, 80 Centre Street, New York, N. Y. Plans and specifications for this contract will be furnished by the CHIEF ENGINEER, DEPARTMENT OF PUBLIC WORKS, DIVISION OF ENGINEERING, STATE OFFICE BUILDING, ALBANY, NEW YORK, upon payment of $20.00. One half of this payment will be returned if the plans and specifications are returned in good condition to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, within two weeks after date of opening bids. The estimated cost of the work under this contract is $682,500.00.

DEPARTMENT OF PUBLIC WORKS,
T. F. FARRELL,
Chief Engineer.

June 19, 1935.

U. S. Government

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 19, 1935.—Sealed proposals in duplicate will be publicly opened in this office at 1 p.m., July 17, 1935, for furnishing all labor and materials and performing all work for *construction of the U. S. P. O. at Plaquemine, La.* Attention is directed to the special conditions of bidding set forth in the specifications, and bulletin No. 51 of the Federal Emergency Administration of Public Works. Upon application one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications must be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. REYNOLDS, Assistant Director of Procurement, Public Works Branch. (2617)

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 19, 1935.—Sealed bids in duplicate will be publicly opened in this office at 1 p.m., July 15, 1935, for furnishing all labor and materials and performing all work for the *construction of the U. S. P. O. at Granville, N. Y.* Attention is directed to the special conditions of bidding set forth in the specifications, and bulletin no. 51 of the Federal Emergency Administration of Public Works as modified by the specification. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (266)

U. S. ENGINEER OFFICE, Pittsburgh, Pennsylvania.—Sealed bids will be received here until 12:30 o'clock p.m. (Eastern Standard Time), July 19, 1935, and then publicly opened for *constructing Lock and Dam No. 9, Allegheny River, about 2 miles above Rimerton, Pennsylvania*, and Alterations to Dam No. 8, Allegheny River, Mosgrove, Pennsylvania, about 7 miles above Kittanning, Pennsylvania. Information on application. (2620)

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 19, 1935.—Sealed bids in duplicate will be publicly opened in this office at 1 p.m., July 17, 1935, for furnishing all labor and materials and performing all work for *construction of the U. S. P. O. at Mechanicsburg, Pa.* Attention is directed to the special conditions of bidding set forth in the specifications, and Bulletin No. 51 of the Federal Emergency Administration of Public Works. Upon application, 1 set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (2613)

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OFFICIAL PROPOSALS

Bids: July 2.

State Highway Work

STATE DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
Albany, N. Y.

Sealed proposals will be received by the undersigned at the State Office Building, 13th Floor, Albany, N. Y., until one o'clock p.m. advanced standard time which is twelve o'clock noon eastern standard time, on Tuesday, July 2, 1935, for the construction and reconstruction of Highways in the following Counties:

Construction	Deposit Required
ERIE ..... (20.5'—24'—48' Concrete 8": 2.76 miles)	$11,000.00
QUEENS ..... (44' & Variable Colored Concrete 8" and 9": 3.83 miles)	30,000.00
Reconstruction CLINTON, FRANKLIN, JEFFERSON, LEWIS & ST. LAWRENCE ..... (Cleaning & Painting Bridges)	550.00

Maps, plans, specifications, and estimates may be seen and proposal forms obtained at the office of the Division of Highways in Albany, N. Y., and at the office of the District Engineers in whose districts the roads are located, upon the payment of Five Dollars ($5.00) for plans and proposal forms. Standard specifications are Two Dollars ($2.00) per copy. No refund will be made on plans, proposal forms or specifications. Plans and proposal forms may also be seen at the office of the State Department of Public Works, State Office Building, Worth and Center Streets, New York City. The addresses of the District Engineers and counties in each district will be furnished upon request.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specifications and contract agreement. Proposal for each highway or contract must be submitted in a separate sealed envelope with the name and number of the highway plainly endorsed on the outside of the envelope.

Each proposal must be accompanied by cash, draft or certified check payable to the New York State Department of Public Works, Division of Highways, for a sum of at least five per centum and not more than six per centum of the estimate accompanying the plans and specifications, and as specified in the advertisement for proposals and the proposal itself. The retention and disposal of such cash, draft or check by the State Division of Highways shall conform with Subdivision 2, Section 130 of the Highway Law, as amended. The successful bidder will be required to execute the contract and comply in all respects with Section 130 of the Highway Law, as amended. The amount of the certified check accompanying the proposal of the bidder to whom the contract is awarded will be returned when ten per centum of the work under the contract has been completed. If Surety Bond is dispensed with, pursuant to the Highway Law, the amount of the bidding check will be returned when fifteen per centum of the contract work has been completed. The right is reserved to reject any or all bids.

OFFICIAL PROPOSALS

The minimum hourly rate of wages for unskilled labor on highway projects has been designated by the State Industrial Commissioner, pursuant to the provisions of Section 220, sub-division d, of the Labor Law, as last amended by Chapter 747, Laws of 1934, as fifty-five cents per hour for projects in the Counties in the Metropolitan District, consisting of Nassau, Rockland, Suffolk, Westchester, and Counties within New York City, and as forty-five cents per hour for the projects in other Counties of the State outside the Metropolitan District. The schedule of wages to be paid for other workmen and mechanics employed on these projects, pursuant to the provisions of Section 220, sub-division d, of the Labor Law, as last amended by Chapter 747, Laws of 1934, has been established and is annexed to and forms a part of the specifications for the projects, and may be ascertained upon reference to the proposal for the project itself.

A. W. BRANDT,
Commissioner of Highways.

Bids: July 22.

Vacuum Filter for Sewage Treatment Plant

ANN ARBOR, MICHIGAN.
CONTRACT NO. 4

Sealed proposals will be received by the Board of Public Works of the City of Ann Arbor, Michigan at the office of the City Clerk until 3:00 o'clock P.M. Eastern Standard Time, July 22, 1935 for furnishing and superintending the erection of a vacuum filter of not less than 165 square feet of filtering area, together with all appurtenances.

The work of which this Contract is a part is to be financed and furnished under the provisions of the National Industrial Recovery Act, Title II, Section 203. The Ann Arbor Project is designated by P.W.A. Docket No. 785.

Each proposal shall be accompanied by a certified check in the amount of at least five per cent (5%) of the amount of the proposal as evidence of good faith on the part of the bidder.

The Contract documents, plans and specifications under which this work will be done are on file and may be examined at the office of the City Engineer, City Hall, Ann Arbor, Michigan, or in the office of Shoecraft, Drury and McNamee, Consulting Engineers, Third Floor, State Savings Bank Building, Ann Arbor, Michigan. Copies thereof may be obtained from the Consulting Engineers by making a deposit of ten dollars ($10.00) for each set of Contract documents, plans and specifications, five dollars ($5.00) of which will be refunded upon their use in a bona fide proposal or upon their return in good condition within ten (10) days after the bidding date.

The Board of Public Works of the City of Ann Arbor, Michigan reserves the right to reject any or all bids and to waive any defect or any informality in any bid in the interest of the City.

BOARD OF PUBLIC WORKS
By FRED C. PERRY,
City Clerk.
Ann Arbor, Michigan.

Bids: July 10.

Street Paving

Easton, Maryland.

Sealed proposals will be received by the Mayor and Council of Easton, at their office in the Municipal Building, Easton, Maryland at 2:30 P. M. Wednesday, July 10, 1935, for paving with tar or asphalt macadam, twenty-four hundred and sixty square yards (2460 sq.yds.) of roadway on South Street, and August Street and for resurfacing approximately forty-three hundred and twenty (4320) square yards of existing macadam pavements, in the Town of Easton, Maryland.

Form of contract, specifications, and plans and blank proposals may be obtained from the Town Engineer upon payment of Two Dollars ($2.00).

A certified check in the sum of Two hundred Fifty Dollars ($250.00) must accompany each bid.

The Mayor and Council reserve the right to reject any or all bids.

RALPH A. TOWNSEND,
Town Clerk.

E. G. KASTENHUBER, JR.,
Town Engineer.

OFFICIAL PROPOSALS

Bids: July 16.

Elementary School Building

Nashville, Tennessee.

Sealed proposals for the construction of an Elementary School Building for the Board of Education, City of Nashville, Tennessee, from a Federal Emergency Administration of Public Works Grant:
P. W. A. DOCKET NO. 5205
SUB-PROJECT NO. 8
will be received by the Board of Public Works of the City of Nashville, Tennessee, until 10 a.m. on the 16th day of July, 1935, and will be opened and read publicly.

Copies of the proposal, contract documents, drawings and specifications may be obtained from the office of C. K. Colley & Son, Architects, 602 American National Bank Building, Nashville, Tennessee. A charge of $25.00 will be made for each set of drawings and documents. Checks shall be made payable to C. K. Colley & Son. The entire payment will be refunded in case a Bona Fide bid is tendered and the specifications and plans returned in good condition to all except the successful bidder.

Each bid must be accompanied by a bond executed by the Bidder and a Surety Company satisfactory to the Public Works Administration in the sum of 5% of the amount of the bid. The bond is required as a guarantee that if the bid is accepted, the contract will be entered into and the performance of it properly secured. The successful bidder will be required to execute a labor bond as required by P. W. A.

Proposal forms must be properly filled out and must not be detached from the specifications.

All bidders must be licensed contractors as required by Chapter 70, of the Public Acts of 1931 of the General Assembly of the State of Tennessee, Section 1. Bidder's name and license number must be placed on the envelope containing these documents.

WAGES: Attention is called to the fact that not less than the minimum wage rates prescribed by the Federal Emergency Administration of Public Works must be paid on this project.

In bidding on projects financed in part or in whole with P. W. A. funds, the bidder MUST execute the certificate that he fully understands the penalty clause as set out in Penalty for False Certification included in the specifications.

All work executed and all materials furnished shall conform to the Requirements and Regulations of the Federal Emergency Administration of Public Works.

This project is being financed in part from funds to be furnished by the United States Government and failure of the City of Nashville to receive the requisite funds from the Government relieves said City of Nashville, its officials and representatives from any responsibility, damage or loss due to the taking of bids. The right is reserved to reject any or all bids.

HILARY E. HOWSE, Mayor.
City of Nashville, Tennessee.

ATTEST:
S. H. McKAY, City Clerk.

U. S. Government

SEALED BIDS, INDORSED "Bids for portal crane, specification No. 7987," will be received at the Bureau of Yards and Docks, Navy Department, Washington, D. C., until 11 o'clock a.m., *10th July, 1935*, and then and there publicly opened, for *15-ton revolving: gantry type crane at the Navy Yard, Charleston, S. C.* The Government reserves the right to require, prior to the award of the contract, a statement of facts in detail of the business and technical organization and plant of the bidder available for the contemplated work, including financial resources for such part of the work as is not provided for by the stipulation in article 16 of the contract, and experience of organization in construction of comparable work. The Government reserves the right to reject any bid respecting which the facts as to business and technical organization, financial resources, plant, or experience, compared with the project bid upon, justify such rejection. Specification No. 7987 and accompanying drawing may be obtained on application to the Bureau or to the Commandant, Navy Yard, Charleston, S. C. Deposit of a check or postal money order for $10, payable to the Chief of the Bureau of Yards and Docks, is required as security for the safe return of the drawing and specification. NORMAN M. SMITH, Chief of Bureau, 12th June, 1935. (264)

OFFICIAL PROPOSALS

Bids: July 8.

Excavation

TRIBOROUGH BRIDGE AUTHORITY
New York City.

Sealed bids will be received by Triborough Bridge Authority at its office, 111 Eighth Avenue, Borough of Manhattan, New York City, N. Y., until 11 o'clock Daylight Saving Time on the morning of Monday, July 8, 1935, for the Excavation for Depressed Roadway, Astoria Boulevard, Queens Connection of the Triborough Bridge, connecting the Boroughs of Manhattan, Bronx and Queens, Contract No. 33.

A more complete description of the work and full information for bidders is given on the drawings and in other contract papers which may be seen at the office of the Chief Engineer, Triborough Bridge Authority, Room 1537, 111 Eighth Avenue, Borough of Manhattan, New York City, N. Y.

Each bid must be accompanied by a deposit in the amount of at least five (5%) per cent of the estimated total contract price as shown in the Schedule of Prices in the Proposal provided in the "Information for Bidders."

The security for the faithful performance of the work shall be in the form of a surety bond in the penal sum of the estimated total contract price as shown in the Schedule of Prices in the Proposal. Such bonds shall be executed by a duly authorized surety company as surety.

The work called for by this proposal is to be financed wholly from monies obtained by loan and grant from the Federal Emergency Administration of Public Works and is subject to the provisions of Title II of the National Industrial Recovery Act and to the rules and regulations prescribed by the President of the United States or the Administrator of the Federal Emergency Administration of Public Works.

Attention of bidders is particularly called to the requirement as to the minimum wage rates to be paid under this contract, as well as to other provisions set forth in "Information for Bidders."

Blank forms for proposals, information for bidders, contract, bond and specifications may be obtained at the office of the Assistant Chief Engineer, Room 1537, 111 Eighth Avenue, Borough of Manhattan, New York City, N. Y. Arrangements will be made whereby prospective bidders desiring sets of prints of the contract drawings for their own use may secure same, the cost thereof ($1.80 per set) to be paid by them.

PAUL LOESER,
Director.

Dated: June 20, 1935.

Bids: July 11.

DIVISION "K"
of Contract "D"

Supplementary Joint Trunk Sewer Sewage Treatment Plant Outfall Sewer and Chamber

Elizabeth, N. J.

Sealed proposals will be received by the Joint Meeting for the construction of an Outfall Sewer and Chamber, for the following municipalities:

City of East Orange, Township of Hillside, Town of Irvington, Township of Maplewood, Township of Millburn, City of Newark, Borough of Roselle Park, Village of South Orange, City of Summit, Township of Union, and Town of West Orange, New Jersey, organized in Joint Meeting under the provisions of an Act entitled, "An Act to authorize two or more municipalities in this State to jointly construct and maintain outlet or trunk sewers," approved March 15, 1899, and the supplements and amendments thereto.

Said proposals will be received in the Council Chamber, City Hall, East Orange, New Jersey, at 3:00 p.m. (Daylight Saving Time), Thursday, July 11, 1935, at which time they will be publicly opened and read.

The work to be let is known as Division "K" of Contract "D," and is to consist of:

(1) The construction of about 450 ft. of a twin rectangular section, reinforced concrete outfall sewer.
(2) The construction of a reinforced concrete outfall chamber.
(3) The construction of two reinforced concrete siphon chambers and connections to existing 24" diameter force main.
(4) The construction of approximately 103 lin.ft. of steel sheet piling bulkhead having an average depth of 26 feet below cut-off elevation.
(5) The dredging of a channel having a depth of approximately 18 feet below mean low water and being approximately 85 feet in length and 24 feet in width at the bottom.

The sewer is to extend from South Front Street in Elizabeth, New Jersey, to Arthur Kill, and the outfall chamber and channel are to be constructed in the Sound.

No bids will be received unless made in writing on blanks furnished, and accompanied by a certified check, for an amount not less than twelve and one-half (12½) per cent of the amount of the bid made payable to the Treasurer of the Joint Meeting.

The project is financed in whole or in part by the Federal Emergency Administration of Public Works and is subject to all of its requirements.

The attention of bidders is called to the minimum rates of wages to be paid by contractors, namely: skilled labor $1.20 per hour, and for unskilled labor $0.50 per hour. All contracts and subcontracts are subject to the approval of the Government Engineer.

A separate labor bond is required in an amount equal to the largest estimated monthly payroll.

Attention of prospective bidders is further directed to paragraph No. 3 of Construction Regulations included in the specifications. The office of the National Re-Employment Service which may be called upon for lists of qualified workers is at City Hall, Elizabeth, N. J. (Joseph McGlynn, Superintendent.)

The Joint Meeting reserves the right to reject any or all proposals and to accept that one which in its judgment best serves the interests of the contracting municipalities.

Plans, profiles, and specifications may be seen at the office of Edward S. Rankin, Secretary, City Hall, Newark, New Jersey, and seen or procured at the office of Alexander Potter, Chief Engineer, 50 Church Street, New York City, upon payment of Twenty-five ($25.00) Dollars, which amount will be refunded only to contractors submitting bona fide proposals, who return the plans and specifications in good order within ten days after opening of bids.

By Order of the Joint Meeting.
PETER A. SMITH,
Permanent Chairman.
EDWARD S. RANKIN,
Secretary.

ALEXANDER POTTER,
Chief Engineer.

U. S. Government

U. S. DEPARTMENT OF AGRICULTURE, Bureau of Public Roads, Washington, D. C., June 20, 1935. Sealed bids will be received at the office of the Superintendent, Vicksburg National Military Park, Vicksburg, Mississippi, until 11 o'clock a.m. C.S.T., July 11, 1935, for *Project 1A1-Vicksburg.* The work consists of *1.5 miles of grading, drainage structures, and paving.* Alternate bids are requested on either concrete pavement or asphaltic pavement on concrete base. Major items are 45,000 cubic yards of excavation and borrow; 20,000 square yards of pavement; 36,000 square yards of furnishing and placing sod; and 3,500 linear feet of culvert pipe. Where plans and specifications are requested, a deposit of $10.00 cash or certified check will be required to insure their return within 15 days after opening of bids. Checks should be made payable to U. S. Department of Agriculture. Plans, specifications, and proposal forms may be obtained at the office of the Bureau of Public Roads, Vicksburg, Mississippi, or at 1725 F Street, N.W., Washington, D. C. H. J. Spelman, District Engineer. (268)

SEALED BIDS will be received at the U. S. Engineer Office, Room 932, U. S. Post Office Building, Canal and Van Buren Streets, Chicago, Illinois, until 10:00 a.m., C.D.S.T., July 8, 1935, and then publicly opened, for furnishing all labor and materials and performing all work for *dredging and disposing of approximately 116,300 cubic yards of material from the Indiana Harbor Canal, Indiana.* Further information on application. (2610)

U. S. Government

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 18, 1935.—Sealed bids in duplicate will be publicly opened in this office at 1 p.m., July 23, 1935, for furnishing all labor and materials and performing all work for the *construction of the U. S. P. O. at Alhambra, Calif.* Attention is directed to the special conditions of bidding set forth in the specifications, and bulletin No. 51 of the Federal Emergency Administration of Public Works and Executive Order No. 6646. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (2612)

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 17, 1935.—Sealed proposals in duplicate will be publicly opened in this office at 1 p.m., July 22, 1935, for furnishing all labor and materials and performing all work for the *extension and remodeling of the steel vault entrances of the U. S. Mint at Denver, Colo.* Attention is directed to the special conditions of bidding set forth in the specification. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $7.00 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer of the U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (2611)

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 17, 1935.—Sealed proposals in duplicate will be publicly opened in this office at 1 p.m., July 22, 1935, for furnishing all labor and materials and performing all work for the *extension and remodeling of the U. S. Mint at Denver, Colo.* Attention is directed to the special conditions of bidding set forth in the specification. Upon application, two sets of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications must be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $7 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn, if the sets are not returned after they have accomplished their purpose. W. E. REYNOLDS, Assistant Director of Procurement, Public Works Branch. (2615)

OFFICIAL PROPOSALS

Bids: July 8.

State Road Work

Hartford, Connecticut.

Proposal forms are now available for the construction of the following projects. Sealed proposals will be received at the office of the State Highway Commissioner, Room 516, State Office Building, Hartford, Connecticut, until 1:00 p.m., E.S.T., Monday, July 8, 1935. Proposal forms may be obtained at Room 516, where plans of these projects may be examined.

FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS PROJECTS

Docket No. 7933

TOWN OF BRIDGEWATER: About 5,627 feet of Waterbound Macadam on the Hut Hill Road. Plans in the New Milford Residency.

Docket No. 6007 (Contract No. 1)

TOWN OF CLINTON: About 4,514 feet of rolled bank run gravel on the Nod Road. Plans in New Haven Residency.

Dock No. 6007 (Contract No. 2)

TOWN OF CLINTON: A 20 foot span Reinforced Concrete Slab Bridge and approaches, known as the Kelsey Mill Bridge, at Indian River on the Mill District Road. Plans in New Haven Residency.

Docket No. 6007 and No. 5985 (Contract No. 3)

TOWNS OF CLINTON AND MADISON: A twin 30 foot span Reinforced Concrete T-Beam Bridge, known as the Duck Hole Bridge over Hammonassett River on the River Road. Plans in New Haven Residency.

Docket No. 7489

TOWN OF FAIRFIELD: A 65 foot span stone faced girder bridge at Mill River on the Sturges Road. Plans in New Haven Residency.

Docket No. 7991

TOWN OF GOSHEN: About 16,511 feet of Waterbound Macadam on the North Road, Route No. 61. Plans in New Milford Residency.

Docket No. 7776

TOWN OF GRANBY: About 9,222' of 8"x20' Waterbound Macadam on the North Granby-Granville Road, Route No. 189 and about 5,513 feet of 7"x18' of Waterbound Macadam on Mountain Road. Plans in Hartford Residency.

Note: Route No. 189 is to be completed; Mountain Road will be built so far as the remaining funds will permit.

Docket No. 7964

TOWN OF WETHERSFIELD: About 5,500 feet of Waterbound Macadam and about 3,136 feet of bituminous macadam on Nott Street. Plans in Hartford Residency.

The following schedule of approved wage rates is to apply on the above contracts:

Class "A" Minimum Rate $0.50 per hour
Common Labor
Stone Spreader

Class "A1" Minimum Rate $0.55 per hour
Reinforcement Placer Helper
House Mover
Mason's Tender
Truck Driver—1½ Tons and under

Class "B" Minimum Rate $0.60 per hour
Rakers and Tampers—Asphalt
Bottom Men
Bulldozer Operator
Compressor Operator
Firemen
Cement Bin Operator
Form Setter for Conc. Pavement
Drill Operator
Grader Operator
Leadmen
Screed Operator
Oilers
Sheeting and Bracing Men
Concrete Mixer Operator (½ yard and under)
Truck Driver over 1½ Ton
Tractor Operator
Distributor and Pump Operator

Class "B1" Minimum Rate $0.65 per hour
Pipe Layer—Sewer
Plumber—Helper
Carpenter—Helper
Steamfitter—Helper

Class "C" Minimum Rate $0.70 per hour
Blacksmith
Painter (priming or protective coat on structural steel and painting of concrete surfaces on other than permanent buildings)
Mechanic
Concrete Finishers
Road Finishers
Stone Wall Fence Builders

Class "C1" Minimum Rate $0.75 per hour
Powder Man or Loader (Under Blaster)
Iron Workers Helper (Structural)
Operator Hoisting Engine (1 drum)

Class "C2" Minimum Rate $0.80 per hour
Concrete Mixer Operator (over ½ cu.yd. and under 1 cu.yd.)

Class "D" Minimum Rate $0.85 per hour
Roller Operator
House Moving Foreman
Carpenter (rough or Assistant, employment governed by excerpts dated Feb. 1, 1935, P.W. 23709, which form part of the Specifications.
Pile Driver Helper
Shovel Operator (under ¾ cu.yd. capacity)

Class "E" Minimum Rate $1.20 per hour
Carpenter
Ditching and Trenching Machine Operator
Mason
Concrete Mixer Operator (1 cu.yd. and over)
Reinforcement Placer
Blasters
Shovel Operators (¾ yard capacity and over)
Riggers
Painter (permanent structure, except priming or protective coat on structural steel)
Pile Driver Engineer
Iron Workers (structural)
Waterproofer
Operator (Hoisting Engine 2 and 3 drum)
Concrete and Cement Finishers Building Work.
Plumber
Steamfitter
Crane Operator

NOTICE

FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS PROJECTS

Attention of contractors bidding on above projects is directed to the requirements of Bulletin No. 2, revised March 1, 1935, and subsequent revisions, of the Federal Emergency Administration of Public Works, which are to be made a part of the contracts. Copies of the Bulletin are available for the information of bidders, in Room 516, State Office Building.

In addition to the performance bond in the amount of one hundred per cent of the contract price, there is required on the above projects, a labor bond in an amount equal to the largest estimated aggregate payroll for any one month during construction.

Trunk Line Projects

TOWN OF BLOOMFIELD: About 2,150 feet of bituminous macadam on Main Street. Plans in Hartford Residency.

TOWN OF GRANBY: A 55' skewspan concrete encased girder bridge and about 645 feet of bituminous macadam approaches at the Salmon River on Route No. 10. Plans in Hartford Residency.

SPECIAL NOTICE TO APPLY ON ALL BIDS

All bidders are required to inform themselves fully on the conditions relating to construction and labor under which the work will be or is now being performed, and the contractor must employ, so far as possible, such methods and means in the carrying out of his work as will not cause any interruption or interference with any other contractor.

NOTE—A certified check or surety company bond, on form furnished by the Highway Commissioner, for one-third of the amount of the bid must accompany each proposal unless the contractor shall have filed with this office an Annual Proposal Bond. The State Highway Commissioner reserves the right to reject any and all bids.

JOHN A. MACDONALD,
State Highway Commissioner.

Bids: July 12.

High-Speed Line

THE DELAWARE RIVER JOINT COMMISSION

Camden, New Jersey.

Sealed bids will be received for furnishing and installing a reversible type moving stairway in the Broadway Station, Camden, New Jersey, for The Delaware River Joint Commission High-Speed Rail Transit Line, to be identified as Contract No. 14, at the office of the Secretary of the Joint Commission, Administration Building, Bridge Plaza, Camden, New Jersey, until 12.30 p.m., Eastern Standard Time, Friday, July 12, 1935, and then and there will be publicly opened and read.

A more complete description of the work and full information for bidders is given in the specifications and contract drawings which may be obtained upon deposit of $10.00 which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Contractors shall pay all employees directly employed on the work the following minimum rates of wage, prescribed by the Federal Emergency Administration of Public Works: Skilled, $1.20 per hour, Unskilled, $0.50 per hour, and Semi-skilled and others as called for in the Specifications.

The Contract is subject to the approval by the Federal Emergency Administration of Public Works. The right is reserved to reject any or all bids.

GEORGE H. EARLE, Chairman,
The Delaware River Joint Commission.
JOSEPH K. COSTELLO, Secretary.
The Delaware River Joint Commission.

Bids: July 10.

Pump, Meters, Etc.

SEWER AND AERATOR CONSTRUCTION

Jackson, Tennessee.

Sealed propcsals will be received by the City Commission of Jackson, Tennessee, until 10:00 A.M. on the 10th day of July 1935, for furnishing all labor, materials hauling and tools necessary for the construction of the following described work from an anticipated Federal Administration of Public Works Loan and Grant made by the Federal Government, being P.W.A. Docket No. 7100 viz:

"Sub-project "A". For the construction of Sanitary Sewer Extensions in East Jackson and West Jackson.

"Sub-project "B". For the construction of an Aerator and a 3MG Reservoir, and making necessary changes in piping and the installation of one high-head pump.

"Sub-project "C". For the furnishing of one low-head and one high-head pump.

"Sub-project "D-1" For the furnishing of approximately 4,100 water meters.

"Sub-project "D2". For the furnishing of approximately 4,100 meter boxes and 4,100 meter holding devices.

"Sub-project "E". For the installation of the above meters, meter boxes and holding devices.

At 10:00 A.M. on said date all bids will be opened and publicly read.

Plans and specifications will be furnished to bona-fide bidders upon application to E. R. Dike, City Engineer, Jackson, Tenn., provided that each bidder shall deposit $10.00 in cash or by check made payable to the City Recorder, to guarantee the prompt return of the plans and specifications in good condition prior to filing of the bids, said $10.00 to be returned to the bidders upon return of the bidding document.

Each proposal shall be accompanied by a certified check or bidders bond in the amount of ten per cent of the bid, said bidder's bond shall be issued by an approved bonding company authorized to do business in the State of Tennessee. Said checks or bonds will be returned to the unsuccessful bidders fifteen days after the opening of the bids and to the successful bidder, when they have entered into contract and executed surety bonds in the full amount of the contract as required by the specifications.

Proposals must be properly filled out and must not be detached from the specifications.

All bidders must be licensed contractors, as required by Chapter 70 of the Public Acts of 1931 of the General Assembly of the State of Tennessee, Sec. 1. Bidders name and license number must be placed on the envelope containing these documents.

WAGES. Attention is called to the fact that not less than the minimum wage rates prescribed by the Federal Emergency Administration of Public Works must be paid on this project.

In bidding on projects, financed in part, or in whole with P.W.A. Funds, the bidder MUST execute the certificate that he fully understands the penalty clause as set out in Bulletin P.W. 19788 included in these specifications.

All work executed and all materials furnished shall conform to the requirements and regulations of the Federal Emergency Administration of Public Works.

Sub-project "C", "D1", and "D2", for furnishing pumps, meters, meter boxes, and meter holding devices will be executed under a material purchase contract and the equipment furnished under these projects will be installed by other contractors. Bidders on sub-projects "C", "D1", and "D2" do not have to be licensed contractors but will be required to comply with all the other provisions as setforth herein. Bidders may submit combination bid on sub-projects "D1", "D2" and "E" if they so desire on bid sheet "F".

This project is being financed from funds to be furnished by the United States Government and failure of the City of Jackson, Tenn. to receive the requisite funds from the Government, relieves the City of Jackson, its officials and representatives, from any responsibility, damage or loss due to taking of bids. The Commission reserves the right to reject any or all bids, to waive informalities in the bids received and to accept any bid or bids which it may deem favorable to its interests and awards are made subject to the approval of the Federal Emergency Administration of Public Works.

LAWRENCE TAYLOR, Mayor,
City of Jackson, Tennessee.
ATTEST: D. W. Luckey, Recorder.

OFFICIAL PROPOSALS

Bids: July 25.

Excavating in the Barge Canal

CONTRACT NO. U. S. 3

From Lock 8 to Lock 10, Scotia to Cranesville, New York

Sealed proposals for Contract No. U. S. 3, excavating in the Barge Canal from Lock 8 to Lock 10, Scotia to Cranesville, New York, will be received at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, until 2 p.m., Eastern Daylight Saving Time, Tuesday, July 25, 1935, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Excavating in the Barge Canal, Contract No. U. S. 3, from Lock 8 to Lock 10, Scotia to Cranesville, New York," and addressed to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the State of New York, or money, for not less than Five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in the sum of Fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y.; at the office of the District Engineer, 109 No. Genesee Street, Utica, N. Y.; at the office of the District Engineer, Weighlock Building, Syracuse, N. Y.; at the office of the District Engineer, Barge Canal Terminal, Rochester, N. Y.; at the office of the District Engineer, 65 Court Street, Buffalo, N. Y., and at the office of the Department of Public Works, 80 Centre Street, New York, N. Y. Plans and specifications for this contract will be furnished by the CHIEF ENGINEER, DEPARTMENT OF PUBLIC WORKS, DIVISION OF ENGINEERING, STATE OFFICE BUILDING, ALBANY, NEW YORK, upon payment of $20.00. One half of this payment will be returned if the plans and specifications are returned in good condition to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y., within two weeks after date of opening bids. The estimated cost of the work under this contract is $490,000.00.

DEPARTMENT OF PUBLIC WORKS,
T. F. FARRELL,
Chief Engineer.

June 19, 1935.

Bids: July 26.

Excavating in the Barge Canal

CONTRACT NO. U.S. 5

From Oneida Lake to Oak Orchard, New York.

Sealed proposals for Contract No. U.S. 5, excavating in the Barge Canal from Oneida Lake to Oak Orchard, New York, will be received at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y., until 2 P.M., Eastern Daylight Saving Time, Tuesday, July 26, 1935, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Excavating in the Barge Canal, Contract No. U.S. 5, from Oneida Lake to Oak Orchard, New York," and addressed to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y., and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the State of New York, or money, for not less than Five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in the sum of Fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y.; at the office of the District Engineer, 109 No. Genesee Street, Utica, N. Y.; at the office of the District Engineer, Weighlock Building, Syracuse, N. Y.; at the office of the District Engineer, Barge Canal Terminal, Rochester, N. Y.; at the office of the District Engineer, 65 Court Street, Buffalo, N. Y., and at the office of the Department of Public Works, 80 Centre Street, New York, N. Y. Plans and specifications for this contract will be furnished by the CHIEF ENGINEER, DEPARTMENT OF PUBLIC WORKS, DIVISION OF ENGINEERING, STATE OFFICE BUILDING, ALBANY, NEW YORK, upon payment of $20.00. One half of this payment will be returned if the plans and specifications are returned in good condition to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y., within two weeks after date of opening bids. The estimated cost of the work under this contract is $840,000.00.

DEPARTMENT OF PUBLIC WORKS,
T. F. FARRELL,
Chief Engineer.

June 19, 1935.

Bids: July 30.

Excavating in the Barge Canal

CONTRACT NO. U. S. 6

From Lock 10 to Lock 13, Cranesville to Yosts, New York

Sealed proposals for Contract No. U.S. 6, excavating in the Barge Canal from Lock 10 to Lock 13, Cranesville to Yosts, New York, will be received at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, until 2 P.M., Eastern Daylight Saving Time, Tuesday, July 30, 1935, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Excavating in the Barge Canal, Contract No. U.S. 6, from Lock 10 to Lock 13, Cranesville to Yosts, New York," and addressed to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, New York, and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the State of New York, or money, for not less than Five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in the sum of Fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y.; at the office of the District Engineer, 109 No. Genesee Street, Utica, N. Y.; at the office of the District Engineer, Weighlock Building, Syracuse, N. Y.; at the office of the District Engineer, Barge Canal Terminal, Rochester, N. Y.; at the office of the District Engineer, 65 Court Street, Buffalo, N. Y., and at the office of the Department of Public Works, 80 Centre Street, New York, N. Y. Plans and specifications for this contract will be furnished by the CHIEF ENGINEER, DEPARTMENT OF PUBLIC WORKS, DIVISION OF ENGINEERING, STATE OFFICE BUILDING, ALBANY, NEW YORK, upon payment of $20.00. One half of this payment will be returned if the plans and specifications are returned in good condition to the Chief Engineer, Department of Public Works, Division of Engineering, State Office Building, Albany, N. Y., within two weeks after date of opening bids. The estimated cost of the work under this contract is $840,000.00.

DEPARTMENT OF PUBLIC WORKS,
T. F. FARRELL,
Chief Engineer.

June 19, 1935.

U. S. Government

U. S. ENGINEER OFFICE, Clock Tower Building, Rock Island, Illinois.—Sealed bids, in duplicate, will be received at this office until 10:00 a.m., July 2, 1935, and then publicly opened, for the *construction of water supply and fuel oil systems at Lock No. 22, below Saverton, Missouri.* Further information on application. (2616)

U. S. ENGINEER OFFICE, P. O. Box 667, Vicksburg, Miss.—Sealed Bids will be received at this office until 11 o'clock a.m., July 18, 1935, and then opened, for furnishing all labor and materials and performing all work for the *construction of three items of concrete-steel sheet pile levee wall at Monroe and West Monroe, Louisiana.* (262)

U. S. Government

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 20, 1935.—Sealed proposals in duplicate will be publicly opened in this office at 1 p.m., July 18, 1935, for furnishing all labor and materials and performing all work for *remodeling* (except elevator) *of the U.S.P.O., Cu.H. & Ct.H., at Cleveland, O.* Attention is directed to the special conditions of bidding set forth in the specification. Upon application, 1 set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (2619)

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 21, 1935.—Sealed proposals in duplicate will be publicly opened in this office at 1 p.m., July 22, 1935, for furnishing all labor and materials and performing all work for the *Construction* (except elevators) *of the U.S.P.O. and Ct.H., at Wilmington, Del.* Attention is directed to the special conditions of bidding set forth in the specification. Upon application, 3 sets of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $15 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (2618)

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 20, 1935.—Sealed bids in duplicate will be publicly opened in this office at 1 p.m., July 25, 1935, for furnishing all labor and materials and performing all work for *construction* (except elevators and vault doors) *of the U. S. Mint at San Francisco, Calif.* Attention is directed to the special conditions of bidding set forth in the specifications, and bulletin no. 51 of the Federal Emergency Administration of Public Works. Upon application, two sets of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $15 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors. But this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (263)

OFFICIAL PROPOSALS

Bids: July 22.

Sewage Pumping Station and Sewage Treatment Plant

ANN ARBOR, MICHIGAN
CONTRACT No. 7

Sealed proposals will be received by the Board of Public Works of the City of Ann Arbor, Michigan, at the office of the City Clerk, City Hall, until 3:00 o'clock p.m. Eastern Standard Time, July 22, 1935, for the construction of a SEWAGE PUMPING STATION AND SEWAGE TREATMENT PLANT.

The Pumping Station is located within the Ann Arbor City limits and is a structure about 22 feet x 30 feet in plan housing sewage pumping units.

The Sewage Treatment Plant is located near Geddes, some four (4) miles east of Ann Arbor, Michigan, and consists essentially of preaeration chamber, primary settling tanks, digestion tanks, aeration tanks and final settling tanks, together with machinery building and office and laboratory building, altogether capable of treating an average flow of 4.5 million gallons daily of sewage.

Certain major items of equipment, including (a) the sewage pumps for the Pumping Station and (b) the Collector Mechanisms, both for the primary and final settling tanks, (c) the equipment for the Digestion Tanks and (d) the blower equipment have been purchased by the City under separate contracts. The equipment covered by items (a), (b) and (d) above will be erected under this Contract; and the equipment covered by item (c) will be erected by the City under another contract.

The work under this contract is a part of a Public Works Administration project, designated as PWA Docket No. 785, and is subject to all of the rules and regulations established by the Federal Government.

Attention is called to the fact that not less than the minimum wage rates prescribed by the Federal Emergency Administration of Public Works, State of Michigan, must be paid in connection with the work under this contract.

Each proposal shall be accompanied by a certified check in the amount of five per cent (5%) of the amount of the proposal, payable to the Board of Public Works of the City of Ann Arbor, Michigan, as security for acceptance of the contract.

The plans and contract documents under which this work will be done are on file and may be examined at the office of the City Engineer, City Hall, Ann Arbor, Michigan, or in the office of Ayres, Lewis, Norris and May, Consulting Engineers, Cornwell Building, Ann Arbor, Michigan, or in the office of Shoecraft, Drury and McNamee, Consulting Engineers, State Savings Bank Building, Ann Arbor, Michigan. Copies thereof may be obtained from the City Engineer until July 15, 1935, by making a deposit of twenty-five dollars ($25.00) for each set of said plans and contract documents, all of which will be refunded upon their use in a bona fide proposal, and fifteen ($15.00) dollars of which will be refunded if not used in a proposal and returned in good condition within ten (10) days after the bidding date. Plans and specifications embracing the work of separate trades, for the use of subcontractors figuring this work may be secured from the City Engineer for an amount determined by the number of sheets of plans required, at the price of 10c. per sheet. Specifications accompanying such plans will be furnished without charge.

The Board of Public Works of the City of Ann Arbor, Michigan, reserves the right to reject any or all bids and to waive any defect or any informality in any bid, in the interest of the City.

BOARD OF PUBLIC WORKS
By FRED C. PERRY, City Clerk,
Ann Arbor, Michigan.

Bids: July 5.

Elimination of Grade Crossings

PORT RICHMOND-TOWER HILL,
STATEN ISLAND, N. Y.
FURNISHING, FABRICATING AND DELIVERING STRUCTURAL STEEL

Sealed proposals for furnishing, fabricating and delivering structural steel for nine bridges (approximately 1,500,000 lbs.), account of elimination of grade crossings, Port Richmond-Tower Hill, Staten Island, N. Y., will be received by the Chief Engineer of The Staten Island Rapid Transit Railway Company, B. & O. Central Building, Baltimore, Md., until one (1) p.m. (E.S.T.) Friday, July 5th, 1935, at which time and place they will be publicly opened and read.

Plans, specifications, and other forms of contract documents, as well as form of contract bond, may be examined at office of Assistant Engineer, S.I.R.T. Ry. Stapleton, S. I., or office of Engineer of Bridges, Baltimore, Md. Copies may be obtained on application to Engineer of Bridges and payment of $3.00, in cash or by check payable to "H. A. Lane, Chief Engineer," of which no refund will be made.

The Staten Island Rapid Transit Railway Company hereby reserves the right to reject any or all bids, or to accept that bid which, in its judgment, is for the best interests of those concerned, provided, however, that no bid will be accepted except subject to the approval of the State Engineer, Federal Emergency Administration of Public Works.

A bid bond with a duly authorized surety company as surety, or certified check, payable to the order of "H. A. Lane, Chief Engineer, S.I.R.T. Rwy. Co.", in an amount not less than five percentum (5%) of the base bid must be deposited by each bidder with his bid as a guarantee that, in case the contract is awarded to him, he will within ten days after notice of such award, execute and deliver such contract, as approved by the State Engineer, and furnish satisfactory contract bond. Deposits of all excepting the three lowest formal bidders will be returned within three days after the opening of bids, and remaining deposits will be returned when the State Engineer has approved the executed contract and returned the same to the undersigned.

The contract bond shall be in an amount not less than the total (estimated) amount of the accepted bid, in form and substance and with a surety or sureties approved by the undersigned and by the State Engineer. Approval by the State Engineer of the executed contract will be contingent upon the furnishing of the required contract bond. In the event that within the time stated, the successful bidder fails or refuses to execute and deliver the contract and/or furnish the contract bond as required, he shall forfeit his deposit as liquidated damages.

This contract is to be financed in part by a grant by the Federal Emergency Administration of Public Works, and is subject to the provisions of the National Industrial Recovery Act and to the rules and regulations prescribed by the President of the United States, or the Administrator of the Federal Emergency Administration of Public Works.

H. A. LANE,
Chief Engineer,
The Staten Island Rapid Transit Railway Company.

June 27th, 1935.

Bids: July 9.

Sanitary Sewer Lines

Greenwood, South Carolina.

Sealed proposals will be received by the City of Greenwood at the office of the City Clerk, City Hall, Greenwood, S. C., until 11:00 a.m., July 9, 1935, for furnishing of materials and building complete, approximately sixteen thousand feet of 8" sanitary sewer lines with all appurtenances and for replacing approximately sixteen hundred cubic yards of filter bed material.

Each proposal must be accompanied by a certified check, payable to the City of Greenwood in an amount equal to five (5%) per cent of the bid, as a guarantee that the contract will be entered into, if awarded. A performance bond equal to one hundred (100%) per cent of the contract price will be required of the successful bidder as surety that he or it will pay for all materials and labor used in said contract and for the faithful performance of same.

All proposals must be made in accordance with the contract provisions of the Federal Emergency Administration of Public Works.

Attention is called to the fact that not less than the minimum wage rates prescribed by the Federal Emergency Administration of Public Works must be paid on this project.

"No contracts will be awarded until bids have been examined and passed upon by the State engineer, P. W. A., for the State of South Carolina, who will satisfy himself that the bidders are capable of carrying on the work bid upon and that the contract is awarded to the lowest responsible bidder."

Plans and specifications are on file at the office of the City Clerk, City Hall, Greenwood, S. C., and with J. Hearst Coleman, City Engineer, Greenwood, S. C.

Bidders may obtain copies of the plans and specifications from the Engineer by inclosing check for fifteen ($15) dollars payable to the Engineer, five ($5) dollars of which will be returned upon the return of the plans and specifications within thirty (30) days after the opening of bids, or upon the submission of a bona fide bid. The city reserves the right to reject any or all bids.

E. DeVORE ANDREWS, Mayor,
City of Greenwood.

Bids: July 12.

High-Speed Line

THE DELAWARE RIVER JOINT COMMISSION
Camden, N. J.

Sealed bids will be received for furnishing and installing lighting systems for the subway portions of The Delaware River Joint Commission High-Speed Rail Transit Line, across the Delaware River Bridge from Eighth and Race Streets, Philadelphia, to the vicinity of Haddon Avenue and Carman Street, Camden, New Jersey, to be identified as Contract No. 12, at the office of the Secretary of the Joint Commission, Administration Building, Bridge Plaza, Camden, New Jersey, until 12.30 p.m., Eastern Standard Time, Friday, July 12, 1935, and then and there will be publicly opened and read.

A more complete description of the work and full information for bidders is given in the specifications and contract drawings which may be obtained upon deposit of $25.00 which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Contractors shall pay all employees directly employed on the work the following minimum rates of wage, as prescribed by the Federal Emergency Administration of Public Works: Skilled, $1.20 per hour; Unskilled, $0.50 per hour, and Semi-skilled and others as called for in the Specifications.

The contract is subject to the approval by the Federal Emergency Administration of Public Works. The right is reserved to reject any or all bids.

GEORGE H. EARLE, Chairman,
The Delaware River Joint Commission.
JOSEPH K. COSTELLO, Secretary,
The Delaware River Joint Commission.

U. S. Government

SEALED BIDS, INDORSED "Bids for locomotive crane, specification No. 7988," will be received at the Bureau of Yards and Docks, Navy Department, Washington, D. C., until 11 o'clock a.m., *10th July 1935*, and then and there publicly opened, for *20-ton locomotive crane with clam-shell bucket at the Navy Yard, Charleston, S. C.* The Government reserves the right to require, prior to the award of the contract, a statement of facts in detail of the business and technical organization and plant of the bidder available for the contemplated work, including financial resources for such part of the work as is not provided for by the stipulation in article 16 of the contract, and experience of organization in construction of comparable work. The Government reserves the right to reject any bid respecting which the facts as to business and technical organization, financial resources, plant, or experience, compared with the project bid upon, justify such rejection. Specification No. 7988 may be obtained on application to the Bureau or to the Commandant, Navy Yard, Charleston, S. C. Deposit of a check or postal money order for $5, payable to the Chief of the Bureau of Yards and Docks, is required as security for the safe return of the specification. NORMAN M. SMITH, Chief of Bureau, 12 June, 1935. (265)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation (Federal Emergency Administration of Public Works Project), Washington, D. C., June 19, 1935. Sealed bids (Specifications No. 629) will be received at the office of the Bureau of Reclamation, Denver, Colorado, until 2 p.m., July 22, 1935, and will at that hour be opened, for furnishing and delivering f.o.b. cars at the shipping point or f.o.b. cars at Boulder City, Nevada; *two 168-inch diameter butterfly valves and two butterfly valves bulkheads for installation in the Boulder Power Plant, Boulder Canyon Project, Arizona-California-Nevada.* The valves and bulkheads will be installed by the Government. No charge for specifications to prospective bona fide bidders; to others, $3.00, not returnable. For particulars, address the Bureau of Reclamation, Denver, Colorado, or Washington, D. C. ELWOOD MEAD, Commissioner. (267)

(Continued on page 65)

POSITION VACANT

YOUNG MAN wanted (Christian), with engineering training for contractor's office. Must have knowledge of shorthand. Opportunity to learn estimating and other phases of contract work. Location suburban New York City. P-19, Engineering News-Record, 330 West 42d St., New York City.

POSITIONS WANTED

CIVIL ENGINEER, graduated 1927, excellent diversified experience here and abroad in design and construction. PW-11, Engineering News-Record, 330 W. 42d St., New York City.

CIVIL ENGINEER, graduate, real estate experience, ten years as engineer on realty developments, appraisals, land purchases. PW-10, Engineering News-Record, 330 West 42d Street, New York City.

CIVIL ENGINEER. Ten years' experience office and field, steel plant construction. Railroad construction, maintenance, and valuation. Knowledge of accounting. PW-18, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

CONSTRUCTION SUPERINTENDENT, 23 years' experience all types buildings. Desires position with smaller corporation in view for future. First class references. Any location. PW-989, Engineering News-Record, 330 West 42d Street, New York City.

ERECTION SUPERINTENDENT or general foreman, 20 years' experience with large manufacturing concern in field erection. Best of references. Location immaterial. PW-14, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

GENERAL CARPENTER FOREMAN, 23 years' experience bridge, dams, sewage disposal plant and general building construction. Location immaterial. Best of references. A. Anderson, 34 W. 126th St., New York City.

HIGHWAY SUPERINTENDENT, 39, 20 years' diversified experience in South, East and Middle West, 10 years with last employer. Desires making connection offering future possibilities. PW-15, Engineering News-Record, 330 West 42d St., New York City.

FOR SALE

Transits and Levels

New and used, sale, rent, repair, prompt service. O. Griner, 920 Oak St., Kansas City, Mo.

SEALED BIDS will be received at the U. S. Engineer Office, 932 U. S. Post Office Building, Canal and Van Buren Streets, Chicago, Illinois, until 10.00 A.M., C.D.S.T., July 10, 1935, and then publicly opened, for sale of *Government-owned Derrickboat No. 3* located *at Chicago Harbor, Illinois.* Further information upon application. (261)

SPECIAL INSTRUCTIONS

Examinations for License (C.E.)

Usually require rigid examination in structural engineering design. Preparation for this portion of examinations arranged to suit individual needs. Wilson Engineering Corporation, College House Offices, Harvard Square, Cambridge, Massachusetts.

BUSINESS OPPORTUNITY

Small Business

Mechanical engineer, 35 years, with experience drafting and calculating on heavy machinery, also some practical foundry apprentice experience, wishes to associate in small shop or engineering project. Will invest moderate sum. References exchanged. BO-5, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

SALESMEN WANTED

UNITED LABORATORIES, Euclid Ave. at Ivanhoe, Cleveland, Ohio, has a few open territories for salesmen with Industrial Sales or Engineering experience. Regional offices and warehouses at convenient locations.

WANTED

ANYTHING within reason that is wanted in the field served by Engineering News-Record can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

■ To *Manufacturers of Equipment*

A sales executive with a successful record. Graduate Electrical Engineer experienced in the design and erection of cranes and material handling apparatus and in the sale of cranes, power shovels, rollers, diesel engines. In charge of purchases of cranes for army during war and familiar with government purchasing as conducted at present. Wide acquaintance with contractors, quarries, mines and purchasing officials.
PW-20, Engineering News-Record
330 West 42d St. New York City ■

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$2,500 to $25,000

This thoroughly organized advertising service of 25 years' recognized standing and reputation carries on preliminary negotiations for positions of the caliber indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over $2,500, send only name and address for details.

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Monitor Type (All Steel) SHOP BUILDING

445'x730' (new unused-unerected).
Fabricated in 1929.
5 units each 89' 0" wide.
26' 0" to Crane Rail and 35' 0" to bottom of trusses.
Weight 4100 tons.
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All Drawings Available.
Will consider sectional Sales.

Located for Mississippi River Shipping

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Railway Exchange CHICAGO, ILL.

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***The Red Granite Quarry of American Granite Company,* and its fixture equipment, located at *Lohrville, Waushara County, Wisconsin,* (about 25 miles west of Oshkosh, near concrete Highway No. 21) will be offered at *public auction* and sold to the highest bidder at *2:00 o'clock P. M., on July 8th, 1935,* on the Main Steps of the Court House in Wautoma, Wisconsin.**

The property, consisting of approximately 93 acres on Chicago & Northwestern Railway, contains an almost unlimited deposit of granite suitable for monumental, building, and paving stone, also for crushing. Buildings and equipment are suitable for efficient operation (personal property equipment will be included if desired). Suitable terms will be made with responsible purchaser for long time payments for at least two-thirds of purchase price.

The proposed sale will be a partial liquidation of the assets of the owner, to whom inquiries may be addressed, at 229 E. Wisconsin Avenue, Milwaukee, Wisconsin. Telephone Broadway 4467.

AMERICAN GRANITE COMPANY

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SURVEYING INSTRUMENTS

SALE—RENT REPAIRING

RE-BUILT REPAIR RENT REAL EXPERTS ALL MAKES

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Finest Workmanship, Reasonable Cost, Speedy Service, on all surveying instrument repairs. (We supply shipping cases.) Rebuilt—new—used instruments for sale—instruments rented—used instruments purchased—satisfaction guaranteed.

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Established 35 years

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Used Steel Sheet Piling

15 ft. long—sufficient to form 160 lineal feet of wall. Can use any section but interested in lowest total cost.

TULLER CONSTRUCTION CO.
Red Bank, N. J.

WANTED
Steel Stiff Leg Derrick

With bull wheel boom approximately 100 feet long. Give price, construction details, condition, list of blocks and accessories if any.

W-16, Engineering News-Record
520 No. Michigan Ave., Chicago, Ill.

Long Island Structural Steel Co.
400-410 Tiffany St., Bronx, N. Y.

We Buy and Sell Structural Steel

ANGLES BEAMS CHANNELS—PLATES
NEW AND USED

WANTED
Crane on cats with Mass. standard boiler. ¾ yd. to 1¼ yd. size. Delivery point, Eastern Mass.

TULLER CONSTR. CO., Red Bank, N. J.

ABSOLUTE PUBLIC AUCTION

SURPLUS

CONTRACTORS' MACHINERY and EQUIPMENT

OF

JAMES STEWART & COMPANY, Inc.

550 EAST 241st STREET, NEW YORK, N. Y.

TUESDAY, JULY 9th, 1935 (STARTING PROMPTLY AT 10:30 A.M., DAYLIGHT SAVING TIME)

Sale Comprises:

35 cu.ft. to 275 cu.ft. Chicago and Westinghouse Air Compressors; No. 60, No. 80, No. 90 and No. 90-A Boyer Pneumatic Riveting Hammers; Ingersoll Rand and Sullivan Steam Tripod Drills; No. 7-S, No. 14-S and No. 21-S Ransome, Smith, Boss and Milwaukee Concrete Mixers, gasoline and steam; Atlas, Nagle, Continental and Novo Engines, gasoline and steam; Lidgerwood, Shannon, Flory and American Steam Hoisting Engines; Union, McKiernan-Terry and Vulcan Pile Driving and Sheeting Hammers; Lawrence, Van-Wie, Morris, Worthington, and Gould Steam Centrifugal Pumps; Deane, Fairbanks-Morse, Worthington, Union, Canton Hughes, Snow and Worthington Steam Piston Pumps; Union, Myers, Chicago and Viking gasoline and electrically operated force and centrifugal Pumps; ¾ yard Erie and ⅝ yard Marion Steam Shovels; 7½ ton Terry & Trench Steel Guy Derricks; Insley Steel Concrete Tower; Haiss and Williams Clamshell Buckets; 7 ton White Dump Body Motor Trucks; Universal Reliance Bucket Elevators; Rolling steel scaffolds; Sheaves; Blocks; Jacks; Cement Bins; Wheelbarrows; Pipe and Fittings; Wooden horses and hundreds of miscellaneous items too numerous to mention.

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Everything will be sold piece by piece

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By Auto: Proceeding on Bronx River Parkway, turn east into Oak Street, Mt. Vernon. Turn south into McQueston Pkway, directly to yard; or: Proceeding on White Plains Road, turn west into South St., Mt. Vernon, then South on McQueston Pkway, directly into yard.

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Industrial Plants Corporation

Auctioneers—Appraisers—Liquidators

Toledo, Ohio — **90 WEST BROADWAY, NEW YORK** — Columbus, Ohio

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1—1½ cu.yd. Dipper Dredge Steel Hull 70'6"x25'2"x6'. Price $20,000.

1—Wiley Whirley Crane, Model 75. Price $6,000.

1—Model 480 Marion Steam Crawler Crane. Price $14,500.

FS-17, Engineering News-Record
520 No. Michigan Ave., Chicago, Ill.

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P&H, Model 700-B, completely reconditioned. A-1 shape, guaranteed. Equipped with new Atlas 6-cyl. engine. Will sacrifice at only $12,000. Will convert as drag, hoe, skimmer or clam. For further details, address

FS-13, Engineering News-Record
520 No. Michigan Ave., Chicago, Illinois

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Complete well point system to cover 340' of trench.
2—**Carter vacuum pumps.**
All swing joints and valves necessary for complete system.
780' of 6" **header pipe.**
100 **well points and risers** and all incidentals for a complete system—system used five (5) months.

FS-8, Eng. News-Record, 330 W. 42d St., N. Y. C.

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New—RAILS—Relaying

ALL SECTIONS

Also contractors equipment, "V" shaped and Western cars, 24 and 36-in. gauge, portable track, gas locos, frogs and switches. Attractive prices quoted, wire for quotations.

M. K. FRANK

480 Lexington Ave., New York, N. Y. — Pittsburgh Pennsylvania

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large stocks at points throughout the country

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Long Distance Phone—L. D. 109

FOR SALE

500 Tons, 75 Lb. ASCE Relaying Rails with Angle Bars. Can Be Inspected

FS-980, Engineering News-Record
330 West 42nd Street, New York City

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FOR Coffer Dams Foundations Water Stops Trenching

FOR Docks Wharfs Jetties Breakwaters

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Steel Sheet PILING

FOR SALE or RENT

KALMAN STEEL CORPORATION

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USED SHEET STEEL PILING

Here is an opportunity to turn **SURPLUS MATERIALS** into **CASH.** We are in the market to buy Used Sheet Steel Piling—any size—any lengths—any tonnage—and no matter where located. We accept Piling either of the old style interlock or the improved sections. Regardless of size, section or condition of piling, or location, we are confident it will pay you to permit us to inspect same and to consider our offer.

L. B. FOSTER CO.

NEW YORK PITTSBURGH CHICAGO

New and Used

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CARNEGIE STEEL COMPANY PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

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100 pcs. 35 to 40 Ft. Car. 15"—M-107.
70 pcs. 20 Ft. Lack. 14"—AP-14.

Attractive Price—Immediate Shipment.

FS-991, Engineering News-Record
520 No. Michigan Ave., Chicago, Illinois

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FROM MILL AND STOCK
NEW—USED SOLD—BOUGHT

Large stocks conveniently located at Atlantic, Pacific and Gulf Points

SHEET PILING, INC.
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Second Hand Wrought Iron and Steel **PIPE** Overhauled Rethreaded Coupled

All Sizes in Stock

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36 & 48-inch Bell and Spigot Cast Iron Pipe. For sale at a bargain.
10,000 ft., 36 inch Class "A."
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Valves and fittings that come up with the pipe. Also any other size, new or reconditioned pipe.

Write, wire or 'phone us for prices.

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Any Size Quantity

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SPECIALISTS—SKETCH WORK—FABRICATION

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PIPE

Reconditioned pipe, new threads and couplings, all sizes. ¾ in. to 36 in., guaranteed suitable for all practical purposes.

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Engineering News-Record

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PIPE For all uses. Also fittings, reconditioned and guaranteed.
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OUR PRICES AND SERVICE SATISFY

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Good Used Equipment

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"WE BUY, REBUILD, SELL or RENT"

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Portable and stationary, belt, with elec. or gas power, sizes from 21 cu.ft. to 1000 cu.ft.

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Vertical and Horizontal types. All sizes from 10 to 100 hp.

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246—Buckets, all sizes and makes.

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Large lot includ. std. ga. 6, 12 and 20-yd., 36-ga. 5 yd. and 24-ga. 1½-yd. Also std. ga. flat and bal. cars.

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9—Port. Belt Conveyors with steel frame, gas or elec. pr. 18 and 24 in. Barber-Greene and Chic. Automatic.
1—Stationary: Barber-Greene 18"x 100'.

CRANES (Locomotive)
1—American Mod. 158-G, 15-ton cap. gasoline oper. locomotive crane, on 8 wh. MCB trucks; 50-ft. boom.
5—Loco. cranes; sta. ga. 30 & 25-t.; Ohio, Browning, American, Indus'l.

CRANES, DRAGLINES and SHOVELS
All Crawler Mounted

1—Link Belt K-55 Diesel No. 1450, 70-ft. boom, 2-yd. dragline bucket and shovel front with 2-yd. dipper.
1—Northwest Model 7, Serial No. 3570, with 2-yd. pull shovel.
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23—Steel and wood, stiff leg and guy derricks, from 1 to 40-ton cap. Complete line derrick fittings.

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17—Steam hammers, including Vulcan, McKiernan-Terry, Union.

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(Electric and Gas)
55—Electric ranging from 20 hp. up to 125 hp., consisting of triple-drum, double-drum and single-drum with A.C. or D.C. mtrs., some with attached swingers. Following makes: American, Clyde, Lambert, Lidgerwood, Thomas.
38—Gas Hoists ranging from 8 to 120 hp., single, double and triple-drums; all standard makes.

PNEUMATIC TOOLS
All sizes and makes of jackhammers, concrete breakers, spades, riveters, drills, wood borers and grinders.

PUMPS
All sizes and types, both force, centrifugal and steam.

TRACTORS
8—Tractors: 3—Monarch 75's; 3—Caterpillar 60's; 2—Caterpillar 30's, with bulldozers.
3—Caterp. 20's; 1—w. hoist attach't.

Send for complete stock list of 2020 machines

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CHICAGO—1155 S. Washtenaw Ave. Phone Nevada 2400
PITTSBURGH—P. O. Box 933 Phone Federal 2000

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2—**50-B Bucyrus Steam Shovels.** Nos. 10698 and 10719.
1—**75-B Lorain Crane,** 60-ft. boom and fairleads. Serial 4220.
1—**75 Lorain Shovel.** Serial 3138.
1—**K-42 Link Belt Crane** 50-ft. boom. No. 1305.
2—**Koehring** Model 301 **Combination Cranes, Shovel and Dragline.** No. C-220 and 456.
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6—**Caterpillar "60" Tractors, also complete line of miscellaneous equipment all rebuilt and located at our Detroit plant. Terms arranged.**

Phone Redford 2200.
Write P. O. Box 67 Redford Station.

UNION EQUIPMENT CO., Inc.
28424 Grand River Ave., Detroit

Sacrifice Prices

2—50-B Bucyrus-Erie Diesel Draglines with 50-ft. booms, light plants, buckets, used approximately eight months on light work. Shop Nos. 10218 and 10219.

1—Back Hoe Attach. for 50-B.

Located this district.

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Do you want to BUY or RENT good equipment in a hurry at reasonable prices?

Then write at once for our 36-page booklet giving complete details of what we have to offer in "Unconditionally Guaranteed" Rebuilt Construction Machinery,

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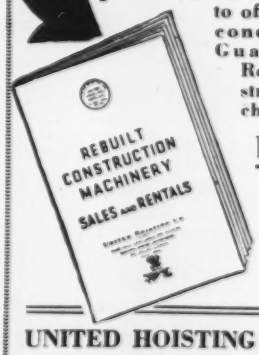

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(Continued from page 57)

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation (Federal Emergency Administration of Public Works Project), Washington, D. C., June 15, 1935.—Sealed bids (Specifications No. 630) will be received at the office of the U. S. Bureau of Reclamation, Casper, Wyoming, until 10 a.m., July 22, 1935, and will at that hour be opened for furnishing labor and materials and performing all work for the *construction of Seminoe dam and power plant, Casper-Alcova project, Wyoming.* The work is located near Casper, Wyoming. The principal items of work and estimated quantities involved are as follows: 541,500 cubic yards of all classes of open-cut excavation; 22,000 cubic yards of tunnel excavation; 5,600 cubic yards of back fill; 1,000 cubic yards of riprap; 330 cubic yards of rubble masonry; 190,340 cubic yards of concrete; 90 cubic yards of porous concrete; 29,600 cubic feet of pressure grouting; drilling 28,100 linear feet of grout, drainage, weep, and anchor bar holes; placing 2,550,000 pounds of reinforcement bars and fabric; constructing 610 linear feet of 4-inch to 12-inch diameter sewer pipe drains; manufacturing and placing 7,000 linear feet of porous concrete draintile; installing 397,000 pounds of metal pipe and fittings; installing 1,002,000 pounds of gates and appurtenances; installing 339,000 pounds of power penstock and outlet pipes; installing 1,542,000 pounds of needle valves and miscellaneous metalwork; installing 8,400 square feet of asphalt-saturated felt roofing; installing 25,700 linear feet of electrical conduit; installing 10,000 linear feet of electrical cable for testing apparatus; furnishing, installing, and operating a concrete cooling plant; and transporting 30,000 hundredweight of freight for the Government. This invitation for bids does not cover the purchase of materials which are to be furnished by the Government. Materials to be furnished by the contractor and those furnished by the Government are described in the specifications which will be a part of the contract. The work must be completed within 950 days. Bid security in an amount not less than 10 per cent and performance bond not less than 50 per cent will be required. No charge to prospective bidders for copies of the specifications and drawings; to others $5.00, not returnable. For particulars, address the Bureau of Reclamation, Casper, Wyoming; Denver, Colorado; or Washington, D. C. ELWOOD MEAD, Commissioner. (2614)

U. S. Government

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 21, 1935.—Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., July 19, 1935, for furnishing all labor and materials and performing all work for the *construction of U.S.P.O., at Far Rockaway, N. Y.* Attention is directed to the special conditions of bidding set forth in the specification. Upon application, two sets of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $10 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U.S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (2621)

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., June 22, 1935.—Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., July 22, 1935, for furnishing all labor and materials and performing

U. S. Government

all work for the *construction of U.S.P.O., at Somerville, Mass.* Attention is directed to the special conditions of bidding set forth in the specification. Upon application, two sets of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $10 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U.S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch. (2623)

U. S. ENGINEER OFFICE, Huntington, W. Va.—Sealed bids will be received here until 11:00 a.m. (E.S.T.), July 26, 1935, and then opened, for *construction of a roller gate dam at Locks No. 1 (Winfield), Kanawha River,* approximately 27 miles below *Charleston, W. Va.* Further information on application. (269)

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Gunite Construction Co.

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Hose, All Purposes
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Texas Co., The

Joists, Steel
Kalman Steel Corp.

Lath, Expanded Metal
Kalman Steel Corp.

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Austin-Western Rd. Mchry.

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General Electric Co.

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Mixers, Concrete and Mortar
Cement-Gun Company
Chain Belt Co.

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Chain Belt Co.

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Chicago Bridge & Iron Wks.

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Vulcan Iron Works (Chic.)

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McKiernan-Terry Corp.
Vulcan Iron Works (Chic.)

Piles, Concrete
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis

Piles, Creosoted Wood
Eppinger & Russell Co.

Piling, Interlocking Steel
Illinois Steel Co.
Inland Steel Co.
Jones & Laughlin Steel Corp.
Kalman Steel Corp.
Spencer, White & Prentis

Pipe Fittings and Accessories
Cast Iron Pipe Research Ass'n
Republic Steel Corp.

Pipe, Metal
Cast Iron Pipe Research Ass'n
Chicago Bridge & Iron Wks.
Jones & Laughlin Steel Co.
Lynchburg Fdry. Co., Inc.
Reading Iron Co.
Republic Steel Corp.

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Lock-Joint Pipe Co.

Pipe, Wood
Wyckoff & Son Co., A.

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Gardner-Denver Co.
Moretrench Corp.
Sterling Engine Co.

Pumps, Stationary
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Gardner-Denver Co.
Sterling Engine Co.

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Bristol Co.

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Texas Co., The

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Good Roads Machry. Corp.

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Texas Co., The

Rope, Wire
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American Steel & Wire Co.
Leschen & Sons Rope Co.

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Republic Steel Corp.

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Bucyrus-Erie Co.

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Illinois Steel Co.
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Phoenix Bridge Co.
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. . . INCREASED SERVICE
. . . CUT ROPE COSTS 75%
. . . MAKES OPERATION SAFER

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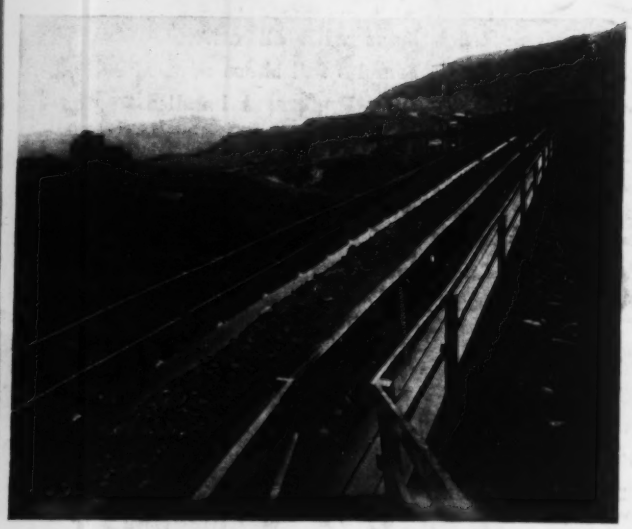

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Equipment in use and available for future extension is sufficient for over 2½ miles of conveyor and comprises 6,500 Jeffrey idlers containing 26,000 Timken Bearings.

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